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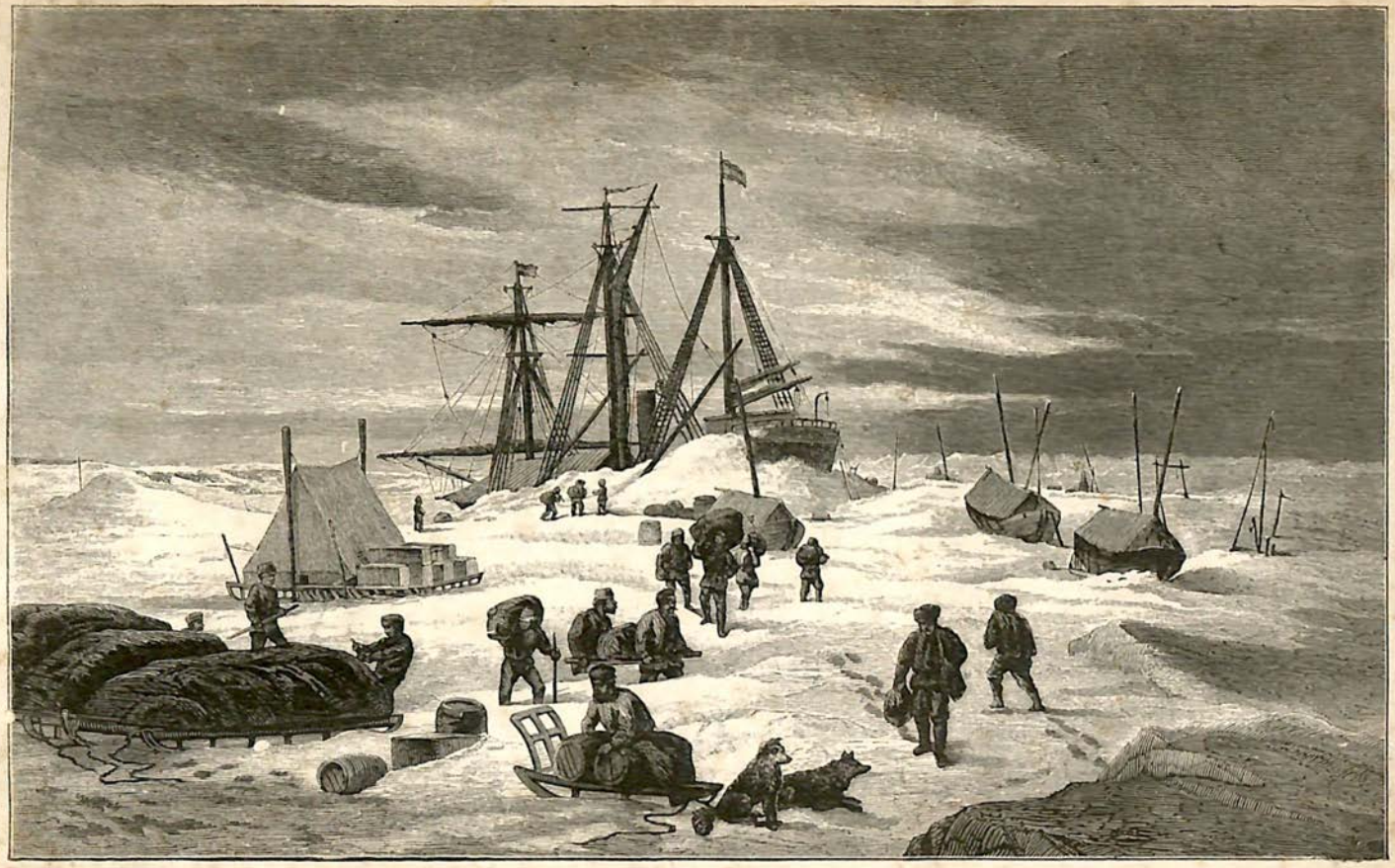
NEW LANDS WITHIN THE ARCTIC CIRCLE.

VOL II.



THE FIRST ABANDONMENT OF THE "TEGETTHOFF."

Front.

NEW LANDS WITHIN THE ARCTIC CIRCLE.

NARRATIVE OF THE DISCOVERIES OF THE AUSTRIAN SHIP "TEGETTHOFF" IN THE YEARS 1872–1874.

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BY

JULIUS PAYER,

ONE OF THE COMMANDERS OF THE EXPEDITION.

8534 85347

WITH MAPS AND NUMEROUS ILLUSTRATIONS FROM DRAWINGS BY THE AUTHOR.

Translated from the German, with the Author's Approbation.

IN TWO VOLUMES.

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ERRATA.

Page 90, line 14, after "(Pallas) and" *read* "a kind of cod (*Gadus*)."

Page 91, line 7, for "*mollisuma*" read "*mollisima.*"

Page 120, line 20, *for* "froms" *read* "forms."

Petermann Land
King Oscar Land
Austria Sound
Rawlinson Sound
Karl Alexander Land
Zichy Land
Wilczek Land
Markham Sound
Mac-Clintock Island
ORIGINAL MAP
of the
KAISER FRANZ JOSEF LAND
surveyed by
JULIUS PAYER.
Explanation.
Open Water
Land Ice
Ice Hummocks with Icebergs
Coast Line not accurately determined.
London, Macmillan & Co.

THE EXPLORATION OF KAISER FRANZ-JOSEF LAND.

THE SLEDGE JOURNEYS.

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AUSTRIAN ARCTIC VOYAGES.

CHAPTER I.

THE EXPLORATION OF KAISER FRANZ-JOSEF LAND RESOLVED ON.

1. The necessity of returning home admitted of no question; but the exploration of the Land of which we had seen hardly anything, beyond the cliffs that lay in our immediate neighbourhood, was also felt to be a necessity. That land, which we were all predisposed to imagine as stretching far beyond this wall of rocks,—of what did it consist? Was it an island or a group of islands? And those white masses lying on these lofty ranges, were they glaciers? To these questions no one as yet could give an answer. But of this there could be neither doubt nor question, that we could not count on our floe for a moment, and that those were lost who were not on board the ship, if the floe with the ship

began to drift. On the 1st of March the Tyrolese announced, that a fissure had appeared half way between the ship and the shore, and the danger of being cut off became the chief subject of talk, both in the cabin of the officers and in the quarters of the men. When, however, we considered the importance of the venture, all hesitation disappeared, and there was not a man in the ship, who would not have made his apprehensions subordinate to the necessity of exploration.

2. As the commander of the expedition on shore, I explained to the council we held on the 24th of February, my plan for the projected sledge journeys, namely: that the sledge parties count on the means of escape being left behind to supplement those they may have at their command, and that the depositing of these means be completed before the sledge parties start; that the expeditions shall begin between the 10th and 20th of March, be continued for six or seven weeks, and take, if possible, the following directions:—one along the coast towards the North, a second towards the West, and a third into the interior, and each to be concluded by the ascent of a dominating height; that, in the event of the sledge parties not finding the ship on their return, they should attempt to go back at once to Europe, and only under the most urgent circumstances pass a third winter in the ice, though the

superfluous stores, which were to be transported to the land, would to a certain extent enable them to do this. I engaged also not to extend these journeys to a date which would prevent the men recruiting their strength before the return of the whole expedition to Europe.

3. The exploration of the strange land having been resolved on, the greatest activity reigned in the ship. There was not a man on board the *Tegetthoff* who was not eager to prepare for the sledge journeys, though all knew that besides the two Tyrolese only four men were to accompany me. Every one longed to take part in the exploration of the unknown land, and the monotony of our life was now exchanged for a state of great excitement; a great venture had been resolved on, and expectations rose with the possibility of discoveries. The comparatively short period for which our stores had now to last enabled us to indulge in what, under the circumstances, might be called luxury. We could thus dispose of more than two hundred bottles of wine, which had been reserved for the sick in the event of a third winter being passed in the ice. Three and twenty men now in three months drank two hundred bottles of wine and smoked like chimneys the superfluous stores of cigars and tobacco. Potatoes, preserved vegetables and fruit were daily on our table. Our allowance of

rum was increased; lights were freely burnt in every corner, and the novel sensation of luxury was universal.

4. While we were all living as if the oppressive load under which we had lain so long had suddenly been removed, in these days of general hilarity and amid the excitement of new plans, our comrade Krisch drew toward his sad and melancholy end. From the beginning of February his malady had made great progress. His body was covered with scorbutic spots; but in spite of all this the hope of speedy recovery constantly animated our afflicted companion, who set us a lofty example of the fulfilment of duty by his zealous activity. In the summer, though already under the influence of his mortal disease, he had been busy in the construction of new ice saws and borers, in order that he might contribute something to the liberation of the ship, and when he heard of the projected expeditions to Franz-Josef Land, he gathered sufficient strength to extort from me the assurance that I would take him with me. But his end was surely though slowly drawing on; his nights were sleepless, and pain left him neither day nor night. At the beginning of March a state of unconsciousness supervened, and the action of his diseased lungs was now to be heard in an uninterrupted rattling in his throat. Moments of mental clearness became more infrequent

in his delirium; help had become impossible, all the care of our physician and of the watchers who never left him was now directed merely to the alleviation of his sufferings. He lingered till we returned from our first sledge expedition on the 16th of March.

KRISCH, THE ENGINEER.

CHAPTER II.

OF SLEDGE TRAVELLING IN GENERAL.

1. THE sledge is preeminently the means of geographical exploration in high latitudes, and as discovery now forms the main purpose of polar expeditions, it may be important to describe clearly and precisely the system we followed, that others may either adopt or improve on our methods. Thus I will enter into many details, not in order to dwell on the inconveniences incident to this mode of travelling, but to show how the greatest amount of safety and protection may be secured to the sledge party.

2. Sledge-journeys presuppose that the ship is safe and secure in a winter harbour. A ship which has not yet completed its summer voyage should avoid them as exceedingly hazardous; and as a principle such expeditions are to be absolutely declined by a ship which is beset in the ice; the success which may have attended some must by no means stimulate others to imitate them. Their object

is the exploration of lands, still unknown or imperfectly known. They presuppose also the existence of ice, closely adhering to a coast, on which the journeys are performed, and this coast-line must run in a northerly direction, if the North Pole be the goal of discovery. Though sledge-parties follow the coast-line they actually travel on the frozen sea; for it is never safe to abandon that line and make for pack-ice at a distance from it. The crossing of glaciers, however small may be their inclination, is always attended with danger; and if the route be stopped by a stretch of land, whose extent forbids dragging, it is of course impossible to proceed. The roughness of the land and its insufficient covering of snow even in winter sufficiently explain this. A sledge cannot, for any considerable length of time, be dragged up an inclination exceeding two or three degrees.

3. The season of the year for sledging must depend on the climate of particular arctic localities, and the capacity of the men to endure low temperatures during the night-camping and driving snow during the march. It is advisable, when more than one year is to be spent in the ice, to begin the more extended sledge journeys in the first year, because the capacities of Europeans to endure cold rather decrease than increase. Sir John Ross, for example, says that his people at the beginning of a third winter were incapable of bearing hardships, especially

those of travelling on the ice. The best season for sledging must always be that time of the year when snow storms are infrequent, for even a healthy and seasoned party will more easily confront a very low temperature than driving snow storms. As a rule these conditions are found most perfectly in autumn; and I do not understand the objection which Hayes makes to this season as being the most damp; whereas as a matter of fact it is the least so. Autumn journeys are preferable to those in spring, both with respect to climate and the state of the road; only they must be commenced early, on account of the rapidly decreasing length of the days.[1] The darkness of winter puts an end to all sledging, and the excessive cold of spring renders it difficult. Summer makes it impossible by breaking up the land ice, or impedes it by transforming the snow into thaw water and sludge. Next to autumn, therefore, the latter part of March, all April, and a part of May, are most adapted for this purpose. It must at the same time be remarked, that Captain Lyon (1822) and Dr. Kane regarded March as peculiarly dangerous on account of the prevalence of storms.

4. Next to the season, the state of the snow road,

[1] Experience acquired both in Greenland and in Franz-Josef Land convince me that autumn is to be preferred to spring for sledge journeys.

depending on the hardening action of wind and cold, has to be considered. The cold should not vary more than from −15° and −25° R., because greater frost transforms the smooth evaporating surface of snow into a rough plain, bestrewed with sharp pointed crystals, so that the sledge instead of gliding along encounters the friction, as if of a sandstone surface, and stops at the least obstacle. Snow of an ivory-like smoothness rarely occurs; on the contrary we find the snow in deep layers as fine as powder, into which we sink knee-deep, or among barriers of hummocks, miles in extent, which impose enormous détours in the transport of the baggage. During the journey from 15° to 25° below zero R. constitutes the pleasantest temperature, and even the nights, under this condition, are passed without inconvenience by a party inured to exposure. Snow storms, however, in their mildest form,—snow drifting, are, at this moderate temperature, distressing and dangerous. In fact, among all the contingencies which may occur during a polar expedition, there is no severer test of enduring perseverance than dragging a sledge in the face of drifting snow at a temperature from 20° to 30° below zero R.

5. The ship in its winter harbour is the only place of refuge, in all cases, where a meeting with Eskimos cannot be counted on. Except for the accidents of

hunting, on which no dependence should be placed, the country itself affords no kind of means of subsistence; hence all the necessaries of life must be carried in the sledges. The heavily laden sledge becomes in truth a ship of the icy wastes, and its loss involves the destruction of the whole party. In order to lighten its load and yet prolong the journey as much as possible, supplies of provisions are often deposited along the routes to be traversed. This may be done, either by previous shorter journeys, or by leaving behind a part of the provisions which have been taken from the ship, or by burying the product of the chase in the manner adopted by fur hunters and Indians. The danger to such stores from the inroads of bears or the breaking up of the ice must be guarded against by a careful selection of localities; and, the place being chosen, the provisions should either be buried four feet deep in snow between steep rocks, somewhat above the level of the sea, or the bags containing them should be suspended on the inaccessible faces of the rocks. The choice of an elevated point is some security against visits from bears. But it is never advisable to build confidently on finding the depôt, or to make the possibility of return dependent on this contingency. A small stock of the necessaries of life should always be kept in reserve, as a prudent precaution in case the depôt should be destroyed. If however the depôts

remain untouched and uninjured, and their numbers be considerable, the duration of the journey, which can be prolonged for thirty or forty days only, where provisions are carried in the sledges, may thus be doubled in extent. The depôts for journeys in the spring are often formed in the preceding autumn, though their preservation is of course exposed to great risk.

6. Sledges are dragged sometimes by men and dogs conjointly, sometimes by men without dogs or by dogs alone. Reindeer are found to be unfit for sledge dragging; although Parry in former days, and Nordenskjöld more recently, frequently attempted to employ them in this service. Though a reindeer is able to make with a sledge as many as 120 miles in three days, it cannot continue such efforts without long periods of repose, nor drag the heavy loads which are requisite in longer journeys. Besides this, he who has had any experience in this mode of travelling, knows the unaccountable capriciousness of these animals, their stubbornness, and the difficulty of feeding them. Natives alone are able to manage them, while to strangers they refuse subjection. When the sledges are dragged by men alone, unexpected contingencies are less to be apprehended, but at the same time their rate of progress is diminished. In an expedition calculated to last a month, ten miles constitute the average day's march, when circumstances

are favourable. If the length of the journey be prolonged, this average will be considerably diminished. The combination of men and dogs in the work of dragging accelerates the speed. With regard to the men employed in this work it is advisable to engage experienced mountaineers[1] of great bodily strength, such men being able to do work for which, it is admitted, sailors have neither training nor inclination.

7. No form of sledge travelling, when measured by results, can be compared with sledging by the help of dogs alone; for this method enables us to compass the greatest possible distance, and diminishes the dead weight of the load in the sledge. Besides this, dogs are not only active but tractable; they show no fear; they can endure hunger longer than men, even while making great exertions; they neither drink nor smoke; neither fuel for the stove to liquefy the snow, nor tent, nor sleeping bag, need be taken for them; none, in fact of those many little things which are indispensable for men. In extreme necessity they may be even used for food. And since a strong dog is able to drag, even for a long journey, double of what he needs for his own support, the surplus falls to the share of the

[1] This is the reason why the English North Pole expedition has engaged the services of two mountaineers accustomed to glacier travelling.

man who accompanies him, and who is able, therefore, to prolong his absence from the ship. Without considering the forced marches which Englishmen, Americans, and Russians have frequently made on the ice with a number of dogs, the employment of a few dogs in sledge expeditions has such conspicuous advantage over teams of men, that I would earnestly recommend the following method of procedure: two teams of dogs, each of two or four strong Newfoundlands, should be employed, one to be driven by the leader of the expedition and the other by one of the most experienced and trustworthy of the party. Each sledge should carry at starting, a weight of from 4 to 7 cwts:, *i.e.* provisions for 30 to 50 days, only needing a slight supplement from the products of the chase. Sixteen miles a day, on an average, may easily be thus accomplished, especially if the rest of the party attached to each sledge walk on before their respective teams. Distances varying from 500 to 800 miles may thus be reached, while 300 or at the most 500 miles are all that men alone in the same time can perform. Journeys of this kind require much experience, so that those men only are serviceable who have much practical acquaintance with life in the Arctic wastes, and not merely with life as it is in the ship, but who are inured to fatigues and skilled in the use of those precautions, which distance from the ship imperatively demands during the prevalence

of extreme cold. With regard to the route itself, whenever the object is the reaching of higher latitudes and the exploration of a still unknown country, it is advisable to choose one from four to eight miles distant from the land. The search for a route is greatly facilitated whenever we can ascend dominating heights to enable us to determine our position. Such a course not only saves us from the necessity of making détours, but affords the only possibility of being able to touch the land at desirable points and of ascertaining the character of the intervening districts. A survey may be made either by triangulation, the base being measured by those who remain behind in the ship and the summits of the mountains serving as the points of the triangles, or by the determination of the geographical latitude and longitude of the different spots. The combination of both methods is of course most desirable.

8. The following instruments may be employed in sledge journeys, according to the degree of exactness which is required: a small universal instrument, a sextant with an artificial horizon, a pocket chronometer, an azimuth compass, a boat compass of simple construction, an alcohol and mercurial thermometer, and two small aneroids.

CHAPTER III.

THE EQUIPMENT OF A SLEDGE EXPEDITION.

1. THE equipment of a sledge expedition on a large scale, demands an amount of circumspection and precision which experience alone can give, and its safety and success may be endangered by the neglect of apparently trifling precautions. At a distance from the ship the most formidable dangers may arise, from allowing the matches to become damp, from the leaking or the loss of a vessel containing spirit, from the setting fire to a tent, which only too probably may happen from the carelessness of the cook, to say nothing of those yet greater perils,—the inability of some of the party to march, the destruction of depôts of provisions by bears, or the breaking in of the sea. The first principle in fitting out such an expedition should be the rejection of everything not absolutely necessary for the support of life, the instruments only excepted; and the second, that the whole of the travelling gear should be of

the most perfect and convenient form. The departure from these rules contributed, among other things, to the melancholy issue of the Franklin expedition. McClintock speaks most emphatically of the evils of over-loading with things not absolutely necessary. The success of an undertaking may be defeated by the neglect even of things apparently insignificant. Mojsejew's sledge expedition along the coast of Novaya Zemlya in 1839 was a proof and illustration of this. It was wrecked within a few days by the snow-blindness of the entire party, caused by their want of snow-spectacles. If we except the journeys of the Russian explorers of the Siberian coast, carried out, however, at the sacrifice of the whole nomad population, and of all the dogs and rein-deer of North Asia—from which to this day the exhausted country has not recovered—the merit of the organisation of sledge expeditions belongs pre-eminently to the English. It was by Parry and James Ross that those experiments with sledges were begun, which have since been brought nearly to perfection by McClintock.[1] The method thus perfected, serves to this day as a pattern to be imitated, as it enables

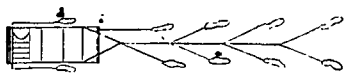
[1] I take this opportunity of fulfilling a duty of gratitude, when I add that in our equipment we followed, in every respect, the tried and tested advice of Admiral McClintock, and that to this we owed for the most part such successes as we achieved.

a party of men inured to hardships and fatigues, to pass many weeks without the help of those resources, which only a ship in such icy wastes can afford. I will now endeavour to describe with sufficient detail the equipment of our sledges in the journeys we carried out.

2. The changeableness of the weather during the season for sledging, and the character of our expeditions, required the employment of three sledges of different sizes. The smallest of these was a dog sledge, and the two others were larger and intended to be drawn by men. The runners were respectively 6, 8 and 11 feet long, and $1\frac{1}{2}$, 2 and $2\frac{3}{4}$ inches broad[1]—gently curved at each end—and about one foot high, so as to raise the lading above the snow. The sledges were constructed of the best ash, and carried loads amounting to 7, 12, and 20 cwts respectively. The two runners were fastened together by two strong front boards, and by four cross-pieces of wood firmly lashed to the upright standards of the sledge, which were themselves dovetailed into the runners. Screws were sparingly used and chiefly in the fittings of the two horns of the sledge and of the rail, on which the rifles were suspended and which also was used to

[1] Broad runners facilitate progress through deep snow. March 7, 1874, we scarcely could move a sledge of medium size with its load, though we afterwards transported the same load easily with a sledge with broader runners; and the former became available when we fastened a pair of Lapp snow-shoes on its runners.

push and guide the sledge. The rail was, therefore, of considerable strength, in order to withstand the pressure of a man's force. The runners were shod with steel carefully rivetted on. The accompanying sketch shows the manner in which a sledge is drawn by a team of men and dogs combined. Those who take the longest steps in the march should precede, and the less active should be placed in the middle, so that any slackness may be easily detected; for in a sledge journey it is disgraceful to draw a weight less than the weight of what we can

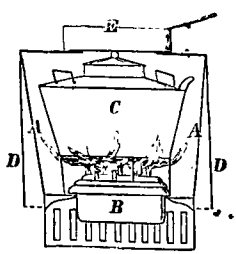


TEAM OF SEVEN MEN AND THREE DOGS.

eat. The centre trace should never be grasped, as this diminishes the force of the pull.

3. The proper construction of the cooking apparatus is of the greatest importance, the great principle being to develop heat and prevent its escape as much as possible. The accompanying woodcut represents an apparatus which excellently well fulfils this condition. A, is the inner compartment; B, the holder containing about a bottle of spirit, with seven wicks; C, the covered pan for cooking; D, the outer case; and E, a pan filled with snow and fitted with a moveable handle, which, being placed over an opening in the outer case, utilizes

the ascending heat, which would otherwise escape, to liquefy the snow. The apparatus should be made of sheet iron, each of its parts of one piece, and there should be no soldering, in order to diminish the risk of breakage and the setting fire to the tent by the escape of the spirit in a state of combustion. These cooking machines should be of different sizes according to the number of men in the expedition. The largest of those used by us consumed $\frac{3}{4}$lb. of spirits of wine to



THE COOKING APPARATUS.

convert snow, with a thermometer from 20° to 24° below zero R., into three gallons of boiling water. On account of the smaller consumption of alcohol, it is better to use ice than snow for the purposes of cooking.

4. Alcohol of the greatest purity and strength is the best fuel and is most easily transported in vessels containing about ten gallons. Next to alcohol, stearine is most to be recommended on account of its great heating powers; and then train-oil, though the smoke and dirt produced

by it in the tent are almost unbearable evils. Petroleum ought not to be employed on account of its dangerous character and its being prejudicial to health. Wood and coals generate too little heat in proportion to their bulk. Parry was the first who, in his journey of 1827, employed spirits of wine; he still used wood and coals in 1820 and Lyon in 1822.

5. The nights are passed either in snow huts, or in tents. If tents be used, the climate must determine their material, whether cotton or sailcloth. A mackintosh floor-cloth should always be spread over the ground of the tent. It is indispensable to make the walls of the snow huts two or three feet high, in order to allow room for movement, and the closed side, *i.e.*, the side opposite the entrance, must be made double, as it is always exposed to the direction of the wind. The tent entrance must be carefully closed with hooks and rings, and should not reach to the ground. A tent formed by two poles, about eight feet long, crossed at each end, with another to rest on these supports is the most simple and secure form of erection. During the journey, a small sail may be advantageously used, whenever the wind is favourable; one of the tent-poles may be used as a mast and an "Alpine stock" may serve as a yard for the sail.

6. The sledge party passes the night in a common sleeping bag, in which there may be, under propitious

circumstances, smaller separate bags for each. When the temperature is not below – 20° R., the sleeping bag may be made out of a warm strong quilt; but when the cold is more intense, it must be made of buffalo skin, and to prevent its being pulled off during the night, it should be buttoned at the top in the middle. Sheepskins cannot be recommended for this purpose, as they are far heavier than buffalo skins; and as they more easily collect moisture, so they freeze more quickly. The sleeping bag should always be wrapped up in the tent and packed with it on the sledge, so that it may come as little as possible in contact with the snow. If the temperature should fall below – 30° R., the travelling party suffers greatly from the frost even in such a sleeping bag, and it would then be advisable to lay an inflated India-rubber mattress under the bag, so that only the legs of the sleepers should be exposed to the influence of the cold.

7. As for arms, it is enough to have three double-barrelled Lefaucheur rifles and one revolver; and even in districts where encounters with bears may be daily expected, three cartridges a day are a sufficient stock of ammunition. These should be explosive shells, with steel points. Small shot cartridges are indispensable on sledge expeditions, as birds are not unfrequently met with. When the cold is excessive, great caution must be used with the cock of the lock, as the brittleness of

the metal then causes it to be easily broken; and from the same cause the hammer will often not stand at half-cock. The guns must not be oiled, as it sometimes happens that the hammer on full-cock will not go down where the lock is smeared with oil. Light woollen gloves should be worn for shooting, in order that the fingers may not be frozen in handling the guns.

8. A chest, fixed on the fore part of the sledge, contains the instruments used in surveying and in the determination of localities; also a thermometer and an aneroid barometer, lucifer matches, and cartridges, packed in tin boxes and carefully protected from damp; a supply of nails and screws, wind-screens for the travellers, sewing materials, the spoons of the party, extra soles of felt for shoes, medical stores, brushes, sketch-book, flags, and a supply of light cord. The pocket-chronometer must be worn in close contact with the body of the leader of the party, to guard it against the hurtful influences of the cold.

9. The provisions should be placed below everything, when the sledge is loaded. The daily allowance for each man ought to be increased by half a pound above the usual rations on board ship, so that about 2½lbs. or 2¾lbs. of solid food fall to the share of each man, and about an equal weight to each dog. McClintock allowed 2½ to 3lbs. a head for the men; but only 1lb.

pemmican a day for the Eskimo dogs. Hayes calculates provision for fourteen dogs for twelve days at 300lbs.—almost 2lbs. a day; and, on another occasion, for fifteen dogs for thirty-eight days, at 800lbs; and considers 1½lb. for Eskimo dogs as too little, when great demands are made on their strength and endurance. From my own experience, I should say, that the least diminution of this quantity of nourishment reduces the capacity to endure great cold and excessive exertions, and produces, after even a few days, a feeling of lassitude both in the men and the dogs, harder to endure than even the sensation of hunger. Parry, in his sledge and boat expedition of 1827, found that 10oz. of biscuit and 9oz. of pemmican were hardly sufficient to sustain a man's strength. "It may be useful," he observes,[1] "to remark, as the result of absolute experience, that our daily allowance of provisions, although previously tried for some days on board the ship, and then considered to be enough, proved by no means sufficient to support the strength of men living constantly in the open air, exposed to wet and cold for at least twelve hours a day, seldom enjoying the luxury of a warm meal, and having to perform the kind of labour to which our people were subject. I have before remarked, that, previously to our

[1] *Narrative of an Attempt to Reach the North Pole.* Pp. 145, 146, 4to. London: 1828.

return to the ship, our strength was considerably impaired, and, indeed, there is reason to believe, very soon after entering upon the ice the physical energies of the men were gradually diminishing, although for the first few weeks they did not appear to labour under any specific complaint. This diminishing of strength, which we considered to be owing to the want of sufficient sustenance, became apparent, even after a fortnight, in the lifting of the bread bags; and I have no doubt that, in spite of every care on the part of the officers, some of the men, who had begun to fail before we quitted the ice, would, in a week or two longer, have suffered very severely, and become a serious incumbrance, instead of an assistance, to our party; and we were of opinion, that in order to maintain the strength of men thus employed, for several weeks together, an addition would be requisite of at least one-third more to the provisions we daily issued."

10. To facilitate inspection, it is advisable to portion off the stock of provisions for each week in separate sacks, and never to open a fresh sack till the previous one has been emptied. The contents of the sacks for the latter weeks should be increased a fifth part at least above the normal weight; because hunger with its accompanying loss of strength generally grows in a distressing manner. The provisions should consist of

boiled beef, hard bread, extract of meat, chocolate, grits, pea-sausages, sugar, rice, condensed milk, and coffee. Tea and the two last mentioned articles of food have an indescribably reviving effect, especially in the morning, and enable the party to make long forced marches, warding off the great enemy of such expeditions—thirst. Pemmican and fatty substances, however, when the temperature is very low, must be used in moderation, inasmuch as they tend to promote this evil. The fact that we require more carbon in our food in winter than in summer, and that the colder a country is, the more of this element should be found in its nourishment, may, indeed, be true for life in settled abodes or on board an Arctic ship, but does not hold good of sledge journeys. As fresh meat affords, under all circumstances, the strongest nourishment, the business of hunting must not be left to chance. In order to diminish the weight, all preserved foods—with the exception of milk—are turned out of their tin cases, and kept in small bags. Wherever there is a certainty of finding drift-wood, I would recommend, as Back does, vermicelli or macaroni, which can then be properly prepared. Good strong tea is of the greatest importance, though at first we set little store by it. A small ration of rum daily is almost indispensable in sledge journeys, especially when the temperature is very low. Franklin (1819) and John

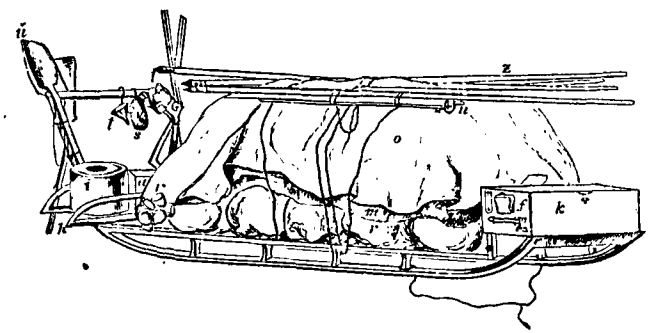
Ross (1829) both pronounce in favour of the moderate use of this spirit, though they were of opinion that rum, when the crews were leading an inactive life on board ship, promoted scurvy. The provisions we have specified do not altogether correspond with the views of earlier polar navigators. Pachtussow and Ziwolka provided themselves in their sledge journeys (1835) with the following stores:—Salted meat, barley-meal, grits, biscuit, butter, tea and sugar; and Parry's provisions, in 1827, consisted of pemmican, wheat-meal, sweet cocoa-powder, biscuit, and 300lbs. of concentrated rum.[1] Hayes preferred dried meat, beef-soup, and potatoes to the usual pemmican.

11. The equipment should be supplemented by the following articles:—A small cask of strong rum, a funnel, an india-rubber bottle to measure out the daily allowance of spirit, a snow-shovel, and a stand for surveying purposes. The sketch on the opposite page exhibits a sledge laden and packed for a long journey.

12. To obviate the danger of being cut off from the ship by the breaking up of the ice, or to enable the party to push on further, boats have frequently been taken in sledge expeditions. For such purposes, boats of thin metal or of wood are not to be commended; those made of leather, india-rubber, or waterproof

[1] *Narrative*, &c. Intro. p. xiv.

sail-cloth, are preferable. But even when their wooden frame-work is made as light as possible, their weight is not less than 300 or 400lbs. The addition of this weight, and the difficulty of lading them, are so much felt on such journeys, that the boat is usually left behind at a little distance from the ship, as was the case in Kane and Hayes' journeys up Smith's Sound. The case is



THE SLEDGE WITH ITS LOAD.

a, Spirit-can.
f, Axe, Thermometer.
h, Dog-sledge.
i, Cooking-machine.
k, Box of instruments.
m, Tent and sleeping-bags.
n and *z*, Surveying-stand and tent-pole.
o, Sledge-sail.
r, Sacks of provisions.
s, India-rubber bottle.
t, Funnel.
u, Shovel.

different, however, in journeys which have to be carried out partly on the ice and partly—and, indeed, chiefly—on the sea. In such cases, boats of sufficient size to carry both the crews and the baggage are requisite. The whale-boat of the Norwegian whalers, carrying seven or eight men, is best adapted for this purpose; although, in long reaches of deep snow, they have their inconveniences, as almost double the number of men is then needed to

drag them along. The boats in such expeditions are transported over the ice when the snow road is good, or only passably good, by means of the largest of the sledges we have described; but, if the snow be very deep, it will be advisable to use sledges with three runners underneath, boarded over, so as to prevent the load from sinking into the snow.[1]

13. As the sledge party has to endure for several weeks all the horrors of Arctic weather, the article of clothing demands special care and consideration. Abundance of woollen under-garments and light furs best answer this purpose. The woollen under-garments should not fit too closely, so as to hinder the circulation of the blood; and the fur coat should be wide, and reach half-way down the leg. It would be a great mistake to take the clothing of the northern nomad as our pattern. Our powers of enduring the severities of Arctic climate are inferior to theirs, so that we cannot attempt to imitate their hardihood; but our own industries enable us to surpass all their resources. During the march, a long garment of lamb's-wool, to which a belly-band is sewn, two stout linen shirts, one or two pairs of woollen drawers, strong cloth trousers, a pair of common mittens, and a light hood, are sufficient for all temperatures.

[1] See description of Parry's Boats—*Narrative*, &c. Intro. p. xi.-xiii.

Wind, especially if it be accompanied with drifting snow, necessitates fur coats, with hoods attached, two pairs of woollen gloves, and a band of flannel to protect the nose, buttoned on to the hood. Wind-guards, made of strong leather, serving to protect the face against wind and frost, must not be neglected. Flannel masks, with

THE DRESS OF THE ARCTIC SLEDGER.

holes cut for the nose and mouth, are of little use, as they are completely frozen in a few hours. A shawl wrapped round the mouth is, after all, the best protection against cold wind, and the least hindrance to respiration. As the shortest beard is converted at once into a glacier by the freezing of the breath, it is necessary to cut it off.

The accompanying figure exhibits the Arctic sledger prepared for the eventualities of cold. It need scarcely, however, be remarked, that no absolutely general rules can be laid down in the matter of clothing, which depends on the different capacities of resistance in individuals, and also on the variations of the weather. When the temperature is not more than 15° or 20° below zero R., some diminution of the garments enumerated above may safely be allowed. Knitted woollen hoods are sufficient protection for the head in almost all cases. Gloves, not intended to be used in drawing and in handling the instruments, should be made of lamb's-wool, and the fingers lined with flannel. The stockings also should be strengthened with flannel at the heels and toes, and should be kept as dry as possible; because wet feet are inevitably frozen when the cold is excessive. Hence, also, the stockings must be changed at night and dried, by being laid on the chest during sleep.

14. In the matter of furs, no better can be selected than buffalo-skin, or wash-leather made of bears' hide; though no covering can surpass that which is made from the skins of birds—Eider-ducks, for example—which is equally good for either summer or winter, during the march, or even during sleep, and which need be exchanged for furs only when the temperature during a night-camping falls 30° to 40° below zero R.

Sheep-skin and wolf-skin are too heavy; and the rein-deer-skin, though so light and warm, is not suitable, as it at once loses the hair when exposed to damp, and does not last a winter with constant use; but of these, the best are those of the young rein-deer killed in autumn. Some Arctic travellers, in the absence of furs, have used an extra covering of light sail-cloth, as a protection against the drifting snow, which penetrates the clothes and stiffens them. We have tried this experiment, but were not convinced of its success. In Parry's second expedition, his people are said to have worn their furs next to their bodies, and to have found this warmer than the wearing of woollens next the skin; but this I am inclined to regard as a mistake. When furs are worn during the march, their congelation and consequent increase of weight are diminished by wearing the furs sometimes inside and sometimes outside. The inhabitants of Lapland and Kamschatka constantly wear the fur outside; and some Eskimo tribes wear double furs—one turned inside, the other outside. If cloth clothes are worn, their surface should be smooth, so as not to harbour the driving snow; and all buttons should be of a large size, as frozen fingers find it easier to manage them.

15. The covering for the feet of a sledge-party should be sailcloth boots, lined with flannel, and soled with stout

felt; and it is not advisable to strengthen the soles by plaiting them with string, as the boot thereby loses that perfect pliability which is indispensable to preserve the foot from the danger of frost-bite. Hence also any covering of india-rubber is objectionable. Leather boots must not be used in sledging; because they become utterly unpliable at a low temperature, and make frost-bites inevitable; and when once put on they cannot be pulled off without being cut to pieces. All boots should be so large and their legs so wide, that they may be put on conveniently over the trousers; and sailcloth boots especially, because of their shrinking from frost, should be so wide, that they can be put on easily over three pairs of strong woollen stockings. The Eskimo, the inhabitants of Lapland, Kamschatka, and other northern nomad tribes, wear the dried grass of *Cyperacites* as their foot-coverings; and this might be recommended, if it did not also involve the use of skin-coverings for the feet, in which no European can make long marches, without their being inflamed. Because, in the Arctic regions, the condensation of moisture in the shape of ice is an enemy constantly to be guarded against, all stuffs are to be avoided which tend to harbour moisture, especially the linings of coats, pockets, and so forth, made of cotton instead of pure wool. India-rubber garments must

never be used, as they prevent evaporation from the body.

16. If dogs are used to draw the large sledges along with men, they ought to be harnessed in the way which the sketch on a preceding page represents. The dog-sledge should be laid across the hinder part of the principal sledge, and made fast to it. If, however, dogs alone are employed, and at walking-pace, they are harnessed in pairs, one pair behind the other. Each dog should draw by a single trace, as we can only thus avoid the constant entangling of the rope-traces. If more than four dogs be employed, they cannot well go in pairs one before the other, but must be harnessed to the sledge in a row, side by side, and the traces must be long, so as to enable the most powerful and best-trained dogs, which are placed in the middle, to be somewhat in advance of the others. The dogs should be selected according to the special purpose for which they are to be employed; for, while an Eskimo dog will run, but shirks the effort of drawing heavy loads, a Newfoundland submits to its load, but goes at a foot's-pace. In the Hudson's Bay territory a cross between a wolf and a dog is regarded as the best animal for draught, because it surpasses the dog proper in strength and courage. Newfoundlands of pure breed are, on the whole, most to be recommended, and next to them, the Eskimo dog, which has a good deal of the

character of the wolf, though he is difficult to hold. These dogs, too, although they are indescribably thievish, voracious, and ill-tempered, in consequence of their harsh treatment and bad feeding, have this further distinguishing quality, that they will stick to a retreating bear with wonderful pertinacity till the hunter comes up to kill it. European dogs are only to be taken when an expedition has not the opportunity of procuring dogs of the kinds we have mentioned; but, if they be employed,

TOBOSSY IN HARNESS.

they should be strong and hardy, with long hair and thick coat. The purity of their breed is of less consequence than their being good-tempered, as fights between large dogs end in the destruction of the weaker. The Ostjaks, in the neighbourhood of Obdorsk, are the nomad tribes nearest Europe who use dogs for sledges; and their breed of dogs is far superior to any other, either in Lapland or Northern Russia. The dogs of Russia in Europe were employed in the expedition (1839) of

Ziwolka and Mojsejew to Novaya Zemlya; but it does not appear that they answered the expectations which had been formed. In sledge-expeditions the dogs are allowed to sleep in the open air; but they must be fastened to stakes, lest the scenting some animal should tempt them to run off. We ourselves, however, allowed a small tent, weighing little, for the few dogs which accompanied us. Dogs whose paws have not been early hardened by long marches on the ice, easily hurt their feet, which do not heal during the journey; and wounds can only be prevented from getting worse by a daily application of collodion and brandy, and by a protection of flannel; and this is the treatment we pursued to Jubinal in the journey we are about to describe. Whenever a dog is exhausted by dragging, it is generally blooded in the tail or ear after the fashion followed by the Siberian tribes.

CHAPTER IV.

THE FIRST SLEDGE JOURNEY.

1. FROM the preceding remarks on the equipment of a sledge, the reader will, perhaps, have gained a pretty clear notion of the procedure by which we are enabled to travel for weeks in Arctic wastes. This description will have shown him the various and manifold contingencies against which a leader has to provide, if he is to conduct an expedition safely and successfully, especially if he commands a body of men, who are neither so careful nor so observant as those who accompanied me in the sledge journeys I am about to describe.

2. I now pass to the first of these, the object of which was to determine the position and general relations of the new Land, which still remained a mystery to us, to reconnoitre a route for its exploration towards the north, and to ascertain what we could of the character of the intervening regions. I regarded the ascent of the

high mountain—Cape Tegetthoff—which we had seen before us for months, as the preliminary step towards the attainment of these ends. Its great distance from the ship had rendered abortive all the attempts to reach it which had been made at the end of last autumn. With the beginning of March (1874) the sledging was now to commence in reality. Though the sun had returned on the 24th of February, it was seldom visible in the remaining days of that month; a heavy water-sky overspread the southern heavens, and the only cheerful precursors of spring were the birds which once more appeared in our neighbourhood. The snow had been distressingly soft, but the north-east winds which prevailed during the first days of March hardened it. When these winds fell, the temperature also fell, and although the beginning of March is regarded as a time little favourable for sledge travelling on account of the excessive cold, our impatience for action overcame all doubts and fears, and on the 9th one of our larger sledges stood ready, laden and packed for an expedition, equipped for a week. It carried an extra quantity of provisions, which were intended to form depôts. From the general store we took 39 lbs. of hard bread, 5 lbs. of pemmican, 16 lbs. of boiled beef, 6½ lbs. of lard, 1 lb. of pea-sausage, ½ lb. of salt and pepper, 6 lbs. of rice, 2 lbs. of grits, 5 lbs. of chocolate, 5 gallons of rum, 1 lb. of

extract of meat, 2 lbs. of condensed milk, and 8 gallons of alcohol. The rest of the baggage consisted of such articles as we have described above. We had besides 3 breech-loaders and 100 cartridges, of which 40 were fired away.

3. I selected for my party six men and three dogs, Gillis, Torossy and Sumbu. As I reserved the picked men of our crew for the contemplated longer journey towards the north, some of the above were not altogether adequate to the work. My two Tyrolese, however, Haller and Klotz possessed great endurance, Lukinovich and Cattarinch in a lesser degree; as for Pospischill and Lettis, they would have done credit to Falstaff's corps. As Pospischill suffered from lung disease, Lukinovich from palpitation of the heart, Haller from chronic rheumatism, and Lettis from a tendency to bronchial catarrh, it may be inferred how necessity alone enabled them to do what they did, when the temperature fell lower than we expected.

4. On the morning of the 10th of March we left the ship, and the "Flag of the sledge journeys," which had hung for so long a time over my berth, now fluttered in the fresh breeze which blew from the north-west. So much had this "at last," excited me, that I could not sleep a wink, and those who were starting on the expedition as well as those who remained behind were as much agitated, as if the conquest of Peru or

Ophir were contemplated, and not the exploration of lands buried under snow and ice. With indescribable joy we began the mechanical drudgery of dragging the sledge, each of us at first wearing a mask, like the members of the "Vehmgericht," until we became habituated to the withering effects of the wind. As we moved along the level surface of the land ice of the preceding autumn, after forcing our way through the hummocky ice, which had formed itself on the north of the ship, we saw behind us some black spots approaching at full speed. These were the dogs we had left behind, which insisted on travelling with us; and much craft and force, supplemented by the logic of a few shots, were needed to force them to return to the ship. My companions interpreted the conduct of the dogs refusing to remain with the ship as a sign foreboding the death of our engineer. As the lading of our sledge amounted to about 6 or 7 cwts. and the snow was favourable for sledging, we were able to advance at the unusual rate of 100 paces in a minute, and in two hours we passed the south-west Cape of Wilczek Island. Close to this Cape we saw an iceberg which had fallen on the ice and crushed it all round, and sheltering ourselves from the wind under the lee of another, we took our mid-day rest, with the thermometer at −21° R. As the sun at noon was so little above the horizon that we got uncertain results for the determination of the latitude,

I preferred during this journey to begin the surveying and, at the same time, the determination of the localities of Franz-Josef Land, by a triangulation of elevated points, to which the measurement of a base was afterwards to be added. Hence the ascent of high mountains formed part of our programme.

5. We continued our march till the ship disappeared from our eyes, and the route now lost its level character and assumed the appearance of a very chaos of ice. In the evening we reached a high rocky promontory of Wilczek Island, near which rose some stranded icebergs, and against which the ice-sheet of the sea, impelled by the waves, was dashed and broken. Close in shore the ice was in violent motion, and as we passed over the "ice-foot," to the amazement of all, three of our men fell into a fissure. All through the night we heard in our tent, which we erected on the land, the cracking and crashing sounds emitted by the ice. Next day—March 11th—making a very early start, the thermometer at $-20°\ 5'$ R., we saw a water-sky to the south, and, after ascending a height, close before us lay the sea, covered with young ice. Heavy mists were ascending from fissures, and the level surface of the young ice glowed with the colours of the morning. Immediately under the coast of the island lay a narrow band of piled-up ice, with traces of recent pressures, and thinking that the

interior was impassable to a laden sledge, we began our toilsome march along its rocky coasts.

6. We were in no mood to observe the picturesque character of our route, for our labours in dragging the sledge over the hummocky ice were excessive. We had frequently to unload the sledge or dig away an obstacle which could not be evaded. The conduct of the dogs was not quite faultless; and as for my companions, if one of them turned round, or if a bird flew past, this was enough to make the rest pause in their pulling, with the ready excuse of surprise at the circumstance. If in such cases Klotz failed to exert his strength, the sledge at once came to a standstill. We pressed on through icebergs on each side of us, shattered by the frost, and amid a constant noise of cracking and splitting produced by the increasing cold. At length, after several hours, we came out on an open level and crossed the gentle slope of a snow-covered spit of land. The rugged mountainous front of Hall Island, and the long glacier walls of M'Clintock Island, now rose before us. Our course lay clearly marked out: it ran in a north-westerly direction over a snow-covered level of old ice towards Cape Tegetthoff. Soon, however, the mist began to rise and floated over the wide expanse of ice, and so obscured every object that we were able to continue our journey in the twilight only by means

of the compass. We determined our course by the aid of small hummocks of ice, which rose above the general level surface, but so great was the difficulty of keeping a definite line in the mist, that we were compelled to halt every four hundred paces, and correct our route by the larger compass, which often showed that we had deviated 20° to 40° in azimuth from the true line, and in some cases the error amounted to even 90°. To add to all this, snow began to fall, so that we were almost blinded, and hence it was that a bear for some time followed our footsteps, unseen by any of the party. When we first sighted him, though he was at a little distance off, he looked enormously large in the mist. We quickly seized our rifles, and one of our men firing precipitately, the bear disappeared, leaving no track of blood to show whether it had been wounded. But bears, even when severely wounded, often leave no such trace; hence doubtless the origin of the assertion, that a wounded bear can dress its own wound, using its paw to apply snow to the injured part.

7. It was our practice in this, as well as in the following expeditions, to rest at noon for an hour or two, and putting up the tent take a meal of hot boiled beef. But the inferiority of an untrained to a well-trained sledge party was seen even in such operations. Much time was wasted; in like manner and from the same cause, the

coffee-making in the morning, the preparation for the march, the taking down of the tent, the loading of the sledge, occupied my party for hours, and the smallest snow-drifting sufficed to blow away all their moral force. As we left the tent, the bear stood again before us, but disappeared as suddenly when we seized our rifles. In the course of a few hours we passed some icebergs shaped like huge tables, and when the wind rose and lifted up the mist for a few moments, we saw the rocky heights of Cape Tegetthoff towering above us at no great distance. The snow began to drive directly in our faces, and meanwhile the bear had followed our steps, often hidden from our sight by the vehement gusts of snow, sometimes on our flank, sometimes in our rear, keeping at about 200 paces distance from us. By feigning unconcern we hoped to stimulate his courage to attack us, reckoning on converting him into food. Suddenly, however, he ran towards us, and our apparent indifference disappeared. In a moment we stood ready to receive him; the sledge was drawn across the line of his advance, and each casting off his drag-rope, knelt and aimed over the sledge, The directions were to aim at the lower part of the skull, and to fire only when he was quite close to us. The dogs were moved to the further side of the sledge, and covered with its sail. Of the other four men, two held the dogs,

a third laid hold of a revolver, and the fourth provided himself with some cartridges ready for contingencies. After the completion of these preparations, no one either moved or spoke. The bear meanwhile moved steadily towards us, stopping for a moment at the spot where a piece of bread had intentionally been placed. Just as he stopped to examine it, three shots in rapid succession went off, and the bear, hit in the head and chest, lay dead on the ground. The dogs, being let loose, rushed on their fallen foe and began to tear his shaggy skin. While we were cutting the bear up, they sat down and watched us, occasionally dipping their tongues in the warm red blood and snapping up the morsels which were thrown to them. The bear we had shot was a female, six feet in length; and after cutting off the tongue and the best portions for meat, we continued our march in the teeth of the driving snow. One of our people had cut his finger badly in dressing the bear, and as the application of chloride of iron did not suffice to stop the violent bleeding, we were compelled to halt and erect our tent about six o'clock in the evening.

8. When we set out again on the morning of the 12th (the thermometer marking $-26°$ R.) all round us was a red undulating waste, and the driving gusts of snow, which hid from our view the nearest rocky heights, pricked us as if with countless sharp-pointed

darts. Such drifting snow, although it greatly impedes travelling, cannot be compared with the tremendous snow-storms I had experienced in Greenland. The same precursory signs were, however, common to both—extraordinary refractions, brilliant auroras, perfect calms, and a dull close atmosphere. In taking down the tent, which was covered with wreaths of snow, every article which fell in it was at once buried under its drifting waves. Of all the tests of endurance in Arctic journeys none exceeds that of continuing the march amid driving snow at a low temperature. Some of my company who had not been accustomed to walk in such tremendous weather, in attempting to button on their wind-screens and nose-bands and fasten up their coats after we had left the tent, at once had their fingers frozen. Our sailcloth boots were as hard as stone, and every one took to stamping to preserve his feet from frost-bite. Under such circumstances the sledge is not packed with that precision which is the only preservative against the loss of the various articles of its contents. To watch against this contingency is the special business of the man who pushes the sledge from behind. Hurry and confusion were visible in the bag of provisions being left open. At last everything was ready: the march began, men and dogs, dragging the sledge along, all coated with snow and entirely covered except the eyes. In a momentary lull of the

wind, we discovered that our march the day before had led us far too much to the south, and Cape Tegetthoff now lay before us directly north. Thither we now directed our steps, and as the wind still came from the north-west, we struck our sledge sail. As a consequence of this marching against the wind, which is most severely felt by the leaders of the team, all, even Klotz, had their noses frost-bitten. We had much difficulty in persuading him to rub his with snow, urging that his nose did not belong to himself alone, but that seven noses and fourteen feet were under the general supervision of the leader, and that each had a share in this general property.

9. As we came under the land, the violence of the snow-drifting somewhat abated, and in about two hours a calm set in. Close before us lay the plateau of Cape Tegetthoff, with its steep precipitous sides. From its summit a line of basalt rocks descended towards the east, ending in two columns, each about two hundred feet high. We reached them just before noon, and the weather being propitious we determined the latitude by observation and found it to be 80° 6′ N.L. The force of the tide not being able to raise or burst the bay-ice, the thaw-water of the spring collects itself on the coast-edge in small lakes. Close under one of these towers of dark-coloured basalt, we set up our tent; and while our cook was preparing our dinner of bear's flesh, we lay in the

sun under the rocks in order to dry our clothes, which were coated all over with ice.

10. About one o'clock I set off with the Tyrolese to the plateau of Cape Tegetthoff. Those who remained behind spent their time in rubbing their feet with snow. Lettis had reserved for us the unpleasant surprise that his feet had been frost-bitten for three hours, and that he had lost all feeling in them. We marched for an hour on

CAPE TEGETTHOFF.

the snow, which lay in tender azure-blue shadow under the long line of basalt rocks, and after climbing for another hour over rosy-coloured masses of snow lying between crystallized rocks, we reached the highest point of the undulating plateau. No ascent could be more interesting, made, as it was, in a country so utterly unknown. Haller and Klotz were born mountaineers, and during my surveys in Tyrol I had made a hundred ascents

of mountains of 10,000 feet, without the tension of expectation I now experienced, as I mounted this summit. The ascent was not without difficulty, and it taxed the extraordinary dexterity of the two Tyrolese to climb up steep icy precipices in their sail-cloth boots. It was about three o'clock in the afternoon when we reached the summit; the temperature had fallen to −28° R. (in the tent the thermometer at the same time marked −25° R. and in the ship −23°3′R.). By a barometrical measurement we found the height to be 2,600 feet. Contrary to expectation the view from the top proved to be limited. In a northerly direction, the atmosphere, laden with innumerable ice crystals, possessed so little transparency that Cape Berghaus, at no distance off, appeared to be covered with a thick veil, and all distant objects were enveloped in a dense mist. Fogs lay over the interior to the west, and banks of reddish vapour covered the icy ocean to the south. Some narrow strips of open water sparkled in the sun. After making a sketch of all that could be distinctly seen, and determining the bearings of some points, we returned to the tent. Here we found Lettis and Cattarinch engaged in rubbing with snow the hands of Lukinovich, which had been frost-bitten, while he was occupied in rubbing the feet of Lettis.

11. Nothing except the wind makes men so sensitive

to cold as the want of exercise. The fall of the temperature had been felt far more by those who remained behind, than by ourselves. Even the wonderful beauty of the snow-clad summit bathed in rosy light failed to modify their severe judgment of Franz-Josef Land. Instead of greeting us with supper ready at the appointed hour, which he ought to have prepared without the use of spirit, the bewildered cook was vainly endeavouring to roast bear's flesh over smoky chips and sticks, and we got our supper only after I had served out a bottle of alcohol. We then went to rest in the common sleeping bag, but soon began to shake with cold, which threw Pospischill, who took oil twice a day for lung-disease, into a fever. When I left the tent to look at the thermometers, the mercury in one had gone down into the bulb and was frozen, and the spirits of wine in the other showed 33° below zero (R.). Some hot grog, for which a whole bottle of strong rum was used, put us all right, raising the temperature of our bodies by one or two degrees. After this refreshment we all fell into a deep sleep, which was incommoded only by the increasing dampness of our clothes.

12. We started again about six o'clock on the morning of March 13. The sun had not risen, the spirit of wine thermometer indicated nearly 35° below zero, and a piercingly cold breeze met us from the land. Even on

board the ship the temperature at the same time marked 30° below zero, a difference to be ascribed to the influence of the land in lowering the temperature. In Greenland we observed still greater deviations of this nature, which seem to show that climatical influences are subject to great variations, even in places which are in close proximity. Cape Berghaus was our goal. From its summit a general view of the distribution of the

MELTING SNOW DURING A HALT NEAR CAPE BERGHAUS.

land under 80° N. lat. was reasonably to be expected. Long before the rise of the sun, the hard snowy plains were tinted with a pale green reflected light, and the icebergs wore a dull silvery hue, while their outlines constantly changed and undulated. Our road was formed from millions of glittering snow crystals, so

hard that the sledge glided over them with difficulty and with a creaking noise, and after three hours, the exertion of dragging had so exhausted us that we determined to unload the sledge, and, after melting some snow, to wet its runners with water. A layer of ice was immediately formed on them, which greatly facilitated the labour of dragging, till it was rubbed off. A broad inlet surrounded by picturesque mountains—Nordenskjöld Fiord—had opened out on our left, and as a large glacier formed the background of this fiord, we took a westerly direction in order to study the ice-formation. The heights surrounding this fiord seemed equally as well fitted as Cape Berghaus for the object we had in view. The further we penetrated into it, the deeper became the layer of fine powdery snow which the wind had deposited in this hollow. At noon we reached the high precipitous termination of Sonklar-Glacier, and pitched our tent by an iceberg.

13. In the afternoon, accompanied by the Tyrolese, I ascended a mountain—Cape Littrow—whose height, by means of an aneroid barometer, we ascertained to be 2,500 feet. From its summit we had a view of the mountains of Hall Island, and of the islands which lay to the east. Not a breath of wind was stirring, and the atmosphere was clearer than usual, so that, without

suffering in the least degree from cold, I could work for three hours, first in sketching our surroundings and then in taking observations. From south-west to north-east the peaks of distant mountains rose above the summits of those in the foreground. This view, while it assured us that the land we had named after our monarch must be of great extent, stimulated our impatience to know its extent, and the nature and relation of its constituent parts. The Wüllersdorf Mountains were the extreme limits of what could be known for the present, and their three peaks glowed in the setting sun above the dark edges of the terraces of the Sonklar-Glacier, whose broad terminal front over-hung the frozen bay of Nordenskjöld Fiord. It was eight o'clock in the evening when we returned to our tent, not, however, before we had made suitable preparations for the observation of the movement of the glacier. Sumbu and Torossy were our companions; but we had to tie them with a rope both in going up and coming down, and we ourselves only mastered the great steepness of the cone of the mountain by steps which Klotz, who went on before, hewed with incomparable dexterity and precision in the ice. During the night the temperature fell to 37° below zero (R.) (−35° in the ship), and I do not believe that we could have passed through it without the help of grog. We drank it as

we lay close together muffled up in our sleeping bag. It was boiling hot, and so strong, that under other circumstances it must have made us incapable of work, yet in spite of the grog, we suffered much all through the night from cold and our frozen clothes.

CHAPTER V.

THE COLD.

1. The coldest day we had during this expedition was the 14th of March. By six o'clock on the morning of that day the Tyrolese and I stood on the summit of the precipitous face of the Sonklar-Glacier. The others remained behind to clear the tent of snow, and to bury a small depôt of provisions in an iceberg which was close at hand. The sun had not yet risen, though a golden gleam behind the glaciers of Salm Island indicated his near approach. At last the sun himself appeared, blood-red, glowing with indistinct outline through the mists and surrounded with parhelia, which generally occur when the cold is great. The tops of the high snowy mountains were first touched with rosy light, which gradually descended and spread over the icy plains, and the sun like a ball of fire shone at length clearly through the frosty mist, and everything around seemed on fire. As the sun even at noon was

but a few degrees above the horizon, this wonderful colouring lasted throughout the day, and the mountains, whose steepest sides were covered with a frosty efflorescence, shone like glass in this radiant light. The alcohol thermometer soon after we came on the glacier fell to 40° 5′ (R.) below zero[1] and a light breeze

ON THE SONKLAR-GLACIER.

blowing from the interior, which would have been pleasant enough on a March day in Europe, exposed me, while engaged in the indispensable work of drawing and measuring, to such danger, that though I worked under the shelter of my Tyrolese companions as a protection against the

[1] This was the maximum of cold I observed during my three polar expeditions.

cold, I was constantly compelled to rub my stiffened and benumbed hands with snow. We had taken some rum with us, and as each took his share, he knelt down and allowed another to shake it into his mouth, without bringing the metal cup in contact with his lips. This rum, though it was strong, seemed to have lost all its strength and fluidity. It tasted like innocent milk, and its consistence was that of oil. The bread was frozen so hard that we feared to break our teeth in biting it, and it brought blood as we ate it. The attempt to smoke a cigar was a punishment rather than an enjoyment, because the icicles on our beards always put them out, and when we took them out of our mouths they were frozen. Even the shortest pipes met the same fate. The instruments I used in surveying seemed to burn when I touched them, and the medals which my companions wore on their breasts felt like hot iron.

2. The phenomena of cold which we had the opportunity of observing during this journey, and which I immediately recorded, will perhaps justify a short break in my narrative, while I attempt to describe them. The horrors of a Scythian winter are an ancient belief, and it used to be counted wisdom to shun the zones where men were frozen, as well as the zones where men were scorched. But it has been assumed, with great exaggeration, that a hot climate

makes men sensual and timid, while a cold climate renders them virtuous and bold. There is far more truth in the opinion held by some observers, and especially by polar navigators, that cold is depressing in its influence, and enfeebles the powers of the will. At first it stimulates to action, but this vigour is quickly followed by torpidity; exertion is soon succeeded by the desire to rest. Persons exposed to these alternations of increased action and torpor feel as if they were intoxicated. From the stiffness and trembling of their jaws they speak with great effort, they display uncertainty in all their movements and the stupor of somnambulists in their actions and thoughts. Most of the circumpolar animals escape, as much as they can, the horrors of the frost: some migrate; others, burying themselves in holes, sleep throughout the winter. The fish, which are found in the small pools of sweet water on the land, are frozen in when these pools freeze, and awake to life and movement again only when the pools are thawed.

3. The human body, with an inner warmth amounting to 28°—30° (R.), is exposed in the wastes of North America and Siberia to frightful cold, the extremes of which have been noted by many different observers. Back recorded in Fort Reliance, Jan. 17, 1833, the temperature $-44°$ R.; Hayes, March 17, 1861, $-44\frac{3}{4}°$ R.; Nevérow, in Jakutzk, Jan. 31, 1838, $-47°$ 3′ R.;

Kane, −45° R.; Maclure, Jan. 1853, −47° R.; John Ross, 1831, −39° R.; and Parry, 1821, −38° 6′ R.; while the lowest temperature, which has hitherto been observed in the Alpine countries of Europe, is only −25° R. In consequence of the difficulty of observing the extremes of cold, lower temperatures than these can scarcely ever have been registered.

4. In order to illustrate the effect of an extraordinarily low temperature on the human frame, the best point to start from is the imagination of a man exposed without clothes to its influence. At 30° or 40° of cold a misty halo would encompass him, the edges of which would have, under certain circumstances, the colours of the rainbow. It is evident that the moisture of the body rapidly coming forth and becoming visible in the cold air would cause this mist, which would decrease with the heat of the body, and disappear on the death of the frozen man. The purpose of clothing is to counteract as much as possible this twofold loss of warmth and moisture, which is the principal cause of the fearful Arctic thirst. But even clothed men exposed to so low a temperature present a strange appearance. When they are dragging a sledge on the march their breath streams forth like smoke, which is soon transformed into a mass of needles of ice, almost hiding their mouths from view; and the snow on which they tread steams with the heat which it

receives from the snow beneath. The countless crystals of ice, which fill the air and reduce the clearness of day to a dull yellow twilight, make a continual rustling noise; their fall in the form of fine snow-dust, or their floating as frosty vapour, is the cause of that penetrating feeling of damp which is so perceptible when the cold is intense, and which receives accretions from the vapours issuing from the open places of the sea. Notwithstanding all this, there is an indescribable dryness in the atmosphere, strongly contrasting with the feeling of dampness. Heavy clouds are impossible; the heavens are covered only by mists, through which the sun and the moon, surrounded by halos, glow blood-red. Falls of snow, as we understand the expression, altogether cease; the snow crystals, under the influence of cold, are so minute as to be almost invisible. The land, the real home and source of cold, acts as the great condenser of vapour, and snow and moisture of every kind, and lies under a deep covering of frozen snow till the colour of its walls and precipices reappears in April. The soil, in the stricter sense of the word, is frozen as hard as iron wherever it appears through the snow, and the mean temperature of Franz-Josef Land (about $-13°$ R.) makes it highly probable, that the frost penetrates to the depth of a thousand feet. Great cold, calm weather, and clear atmosphere, combined are the characteristics of the interior of Arctic

countries. The nearer we approach the sea, the rarer is this combination. Light breezes sometimes occur with a temperature 30° below zero,[1] but the atmosphere is then less transparent.

5. It is well known that sound is propagated far more freely in polar regions than with us. When the cold was great, we could hear conversations, carried on in the usual tone of voice, distinctly at the distance of several hundred paces. Parry and Middendorf both assert that the voice is more audible at a distance in cold weather. The propagation of sound seems to find less hindrance from the irregular masses of ice and cushions of snow, than from the curtains of our woods and the carpets of our vegetation. In the mountainous districts of Europe many of the characteristics of polar regions, besides intense cold, are met with; yet it is a fact, that the report of a gun can scarcely be heard in those situations. Cold, however, can scarcely be regarded as the essential condition of this phenomenon; for the propagation of sound, though in a less striking degree, may be observed even in the summers there.[2] It would seem rather that the amount of moisture in the atmosphere has a more decided influence in the production of this phenomenon.

[1] Hayes mentions a storm occurring at − 27° 2′ R.; but this is probably an error of the press.

[2] In Greenland I once heard at the distance of 800 paces a conversation between Börgen and Copeland carried on in the usual tone.

6. When the snow becomes hard as rock, its surface takes a granular consistence like sugar. Where it lies with its massive wreaths frozen in the form of billows, our steps resound, as we walk over them, with the sound as of a drum. The ice is so hard that it emits a ringing sound; wood becomes wonderfully hard, splits, and is as difficult to cut as bone; butter becomes like stone; meat must be split, and mercury may be fired as a bullet from a gun.[1]

7. If cold thus acts on things without life, how much more must it influence living organisms and the power of man's will! Cold lowers the beat of the pulse, weakens the bodily sensations, diminishes the capacity of movement and of enduring great fatigue. Of all the senses, taste and smell most lose their force and pungency, the mucous membrane being in a constant state of congestion and excessive secretion. After a time a decrease of muscular power is also perceptible. If one is exposed suddenly to an excessive degree of cold, involuntarily one shuts the mouth and breathes through the nose; the cold air seems at first to pinch and pierce the organs of respiration. The eyelids freeze even in calm weather, and to prevent their closing we have constantly to clear

[1] Sir John Ross frequently did this, sending the bullet through a solid board. The freezing point of quicksilver is $-32°$ R. It varies however between -32 and -34 R., according to the purity of the metal.

them from ice, and the beard alone is less frozen than other parts of the body, because the breath as it issues from the mouth falls down as snow. Snow spectacles are dimmed by the moisture of the eyes, and when the thermometer falls 30° below zero they are as opaque as frost-covered windows. The cold, however, is most painfully felt in the soles of the feet, when there is a cessation of exercise. Nervous weakness, torpor, and drowsiness follow, which explains the connection which is usually found between resting and freezing. The most important point, in fact, for a sledge party, which has such exertions to make at a very low temperature, is to stand still as little as possible. The excessive cold which is felt in the soles of the feet during the noon-day rest is the main reason why afternoon marches make such a demand on the moral power. Great cold also alters the character of the excretions, thickens the blood, and increases the need of nourishment from the increased expenditure of carbon. And while perspiration ceases entirely, the secretion of the mucous membranes of the nose and eyes is permanently increased, and the urine assumes almost a deep red colour. At first the bowels are much confined, a state which, after continuing for five and sometimes eight days, passes into diarrhœa. The bleaching of the beard under these influences is a curious fact.

8. Although, theoretically, the fat endure cold better than the lean, in reality this is often reversed. Somewhat in the same way it might be argued that the negro would have an advantage over the white man, for the former as a living black-bulb thermometer is more receptive of the warmer waves of heat. But blackening the face or smearing the body with grease are experiments which could only be recommended by those who have never been in a position to try them. The only protection against cold is clothing carefully chosen, and contrivances to avoid the condensation of moisture. All articles of dress are made as stiff as iron by the cold. If one puts off his fur coat and lays it down for a few minutes on the ground, he cannot put it on again till it be thawed. The fingers of woollen gloves become as unpliable as if they belonged to mailed gauntlets, and therefore Arctic travellers, except when engaged in hunting, prefer to use mittens.

9. Constant precautions are needed against the danger of frost-bite, and the nose of the Arctic voyager especially becomes a most serious charge. But no sooner has its safety been secured, than the hands which have rubbed it with snow are threatened with the same fate. The ears, however, are well protected from frost by the hood. Frost-bite, which is caused by the stoppage of blood in the capillaries, evinces itself by a feeling of

numbness, which, if not immediately attended to, increases to a state of complete rigidity. Slight cases are overcome by rubbing the part affected with snow. When the cold is excessive, feeling accompanied with a prickling sensation only returns after rubbing for hours. Under all circumstances, freezing water with an infusion of hydrochloric acid is the best means of restoring circulation. When the frost-bitten member is immersed in this, it is at once overspread with a coating of ice, but as the temperature of the water slowly rises the frozen limb is gradually thawed. The longer persons are exposed to a low temperature, the greater becomes their sensitiveness under it. Their noses, lips and hands swell, and the skin on those parts becomes like parchment, cracks, and is most sensitive to pain from the least breath of wind. In cases of neglected frost-bite, the violet colour of a nose or hand is perpetuated, in spite of all the efforts made to banish it. Frost-bites of a more severe character will not yield to mere rubbings with snow, but should be treated with the kind of cold bath we have described, continued for some days. The formation of blisters, the swelling of the parts affected, great sensitiveness and liability to a recurrence of the malady are the consequences. In many cases a sensitiveness to changes of temperature lasts for several years. Amputation is inevitable in severe and neglected cases. When

circulation has been restored, a mixture of iodine and collodion—10 grains to an ounce—may, according to the experience of Dr. Kepes, be advantageously applied to reduce the inflammation which generally results.

10. It is remarkable that great heat as well as great cold should generate the great evil—thirst. It is also remarkable how rapidly the demoralisation produced by thirst extends, when any one of the party begins to show signs of suffering from it. Habit, however, enables men to struggle against thirst more successfully than against hunger. Many try to relieve it by using snow; which is especially pernicious when its temperature falls considerably below the point of liquefaction. Inflammation of the mouth and tongue, rheumatic pains in the teeth, diarrhœa, and other mischiefs, are the consequences, whenever a party incautiously yields to the temptation of such a momentary relief. It is in fact a mere delusion, because it is impossible to eat as much snow—say a cubic foot—as would be requisite to furnish an adequate amount of water. Snow of a temperature of 30° to 40° below zero feels in the mouth like hot iron, and does not quench but increases thirst, by its inflammatory action on the mucous membranes of the parts it affects. The Eskimos prefer to endure any amount of thirst rather than eat snow, and it is only the Tschuktschees who indulge in it as a relish with their food, which is always eaten cold. Snow-eaters

during the march were regarded by us as weaklings, much in the same way as opium-eaters are. Catarrhs of every kind are less frequent in polar expeditions, and the chills to which we are exposed by passing suddenly from the cold of the land journey to the warmer temperature of the ship, have no evil consequences. It deserves to be investigated whether this arises from the difference of the amount of ozone in the atmosphere of the respective latitudes.—Now let us return to our journey.

11. After crossing over the Sonklar-Glacier and measuring its slight inclination of 1° 6′, we climbed an elevation to ascertain the most promising route for penetrating in a northerly direction; and none seemed better suited than that which lay over its back, which seemed free from crevasses. But we looked in vain for the fancied paradise of the interior, which had existed only in our desire to clothe in glowing colours the Land, from which we had been so long held back. The true character, however, of Kaiser Franz-Josef Land, so far as it could be explored in this and the following sledge expeditions, will be the subject of the next chapter. The accompanying sketch represents a block of snow, about the height of a man, at the foot of the Sonklar-Glacier, to which the winds had given a fanlike shape. In the afternoon, after inspecting the stakes which we had fixed for measuring

the motion of the glacier, we came back to the tent and began our return march to Cape Tegetthoff and the ship. A cutting wind compelled us to make constant efforts against frost-bites. With a heavy creaking noise the sledge was dragged over the hard snow, and to our reduced strength it seemed to be laden with a double load. The night is generally the hardest part of such expeditions, and our camping out during the night

BLOCK OF SNOW.

under the cliffs of Cape Tegetthoff was especially bitter. Happy was he who, exhausted by the labour of dragging, fell asleep at once. As usual, we dug a deep hole in the snow and loosened it as much as possible, so that we might profit by its property of being one of the worst conductors of heat. In a short time the inside of the tent was covered with rime frost, and we ourselves with ice. The tongue only seemed to recover its former mobility with those who bewailed their loss of knives, stockings, gloves—yea, of everything, even their

place in the tent. They ate their portion of bear's flesh much as if they had been chloroformed, and dropping alseep in their stiffened icy coat of mail, they were awoke by its gradual thawing, to reiterate without cessation how cold it was ; a fact which no one present was prepared to dispute. The alcohol thermometer stood at 39° below zero (− 36° on board the ship), and when the warmth produced by the exercise we had taken and by the effects of supper was gone, the feeling of cold was so intense that it seemed far more probable that we should be frozen to death than that we should sleep. The cook therefore received orders to brew some strong grog, and forthwith six spirit flames burnt under the kettle filled with snow ; but to make snow of such extreme coldness boil quickly we should have had to place the kettle over Vesuvius itself in the height of an eruption.

12. We now slept without stirring a limb, and about five o'clock in the morning of the 15th of March we started to compass the twenty miles which lay between us and the ship in one march, without encountering the suffering of another night's camping out in the snow. The weather was as clear as it is possible to be at a temperature of − 38° R., and going along with a light breeze from the north, we made use of our sledge sail to such advantage that we reached the gentle ascent of the west point of Wilczek Island after a

march of seven hours. We formed a second depôt of provisions on the summit of a rocky promontory, whence we discerned with a telescope the masts and yards of the ship lying behind an iceberg, and our fears and anxieties lest it should have drifted away in our absence were dissipated by this glad view. Our return to the ship could no longer be a matter of choice; it had become a necessity. Lettis had been unable for some days to take any share in the labour of dragging, and walked along in shoes made of reindeer hide, on account of his frost-bitten feet. Haller also wore similar shoes to save his swollen feet; Cattarinch's face was frost-bitten, and he too suffered from lameness; Pospischill, who could no longer wear his shrunk-up fur coat, so suffered from frost-bite in both hands, that I sent him on to the ship, that he might have the help of the doctor as soon as possible. It was with much effort that we made the last six hours' march; and when at length, stiff with ice, we passed between the hummocks that lay around the ship, Weyprecht, Brosch, Orel, and eight sailors came to meet us, who, alarmed at the inability of Pospischill to speak in answer to their questions, had set out from the ship in order to find us.

13. As I entered my berth I heard the hard breathing of our poor comrade Krisch. For more than a week he had lain without consciousness; yet death had not come

to relieve him. On the afternoon of the 16th of March a sudden cessation of all sound told us that he was no more! Next day, his body, placed in a coffin, was brought on deck, and our flag hoisted half-mast high. On the 19th, when the thermometer was at −20° 6′ R., the body was committed to its lonely grave in the far north. A mournful procession left the ship, with a sledge, on which rested the coffin covered with a flag and cross, and wended its way to the nearest elevation on the shore of Wilczek Island. Silently struggling against the drifting snow, we marched on, dragging our burden through desolate reaches of snow, till we arrived, after a journey of an hour and a half, at the point we sought on the island. Here, in a fissure between basaltic columns, we deposited his earthly remains, filling the cavity up with stones, which we loosened with much labour, and which the wind, as we stood there, covered with wreaths of snow. We read the prayer for the dead over him who had shared in our sufferings and trials, but who was not destined to return home with us with the news of our success; and close by the spot, surrounded with every symbol of death and far from the haunts of men, we raised as our farewell a simple wooden cross. Our sad and solemn task done, there rose in our hearts the thought, whether we ourselves should be permitted to return home, or whether we too should find our resting-place in the

THE BURIAL OF KRISCH.

unapproachable wastes of the icy north. The wind blowing over the stiff and stark elevation where we stood, covered us all with a thick coating of snow, and caused the appearance of frost-bite in the faces and hands of some of our party. The decoration of the grave of our comrade with a suitable inscription was therefore deferred till the weather proved more favourable. We found considerable difficulty in returning to the ship through an atmosphere filled with snow.[1]

[1] It may easily happen in such weather that travellers on the ice should have great difficulty in finding the ship, though they should pass by it at less than 200 paces distant. The direction of the wind contributes but little towards the ascertaining of their position; amid hummocks of ice the wind constantly changes. On the 6th of March, Haller and I wandered about for hours amid drifting snowstorms. Pekel, who came to us from the ship, guided us rightly.

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CHAPTER VI.

A GENERAL DESCRIPTION OF KAISER FRANZ-JOSEF LAND.

In now presenting a general view of those parts of Kaiser Franz-Josef Land which were explored by us, I must be allowed to anticipate the order of my narrative which describes the subsequent sledge expeditions, by which our knowledge of the discovered country was so considerably enlarged.

1. The country, even in its already ascertained extent, is almost as large as Spitzbergen, and consists of two main masses—Wilczek Land on the East, and Zichy Land on the West, between which runs a broad sound called Austria Sound, extending in a northerly direction from Cape Frankfort till it forks at the extremity of Crown-Prince Rudolf's Land, 80° 40′ N.L. One branch of it, a broad arm running to the north-east —Rawlinson Sound—we traced as far as Cape Buda-Pesth. Wilczek and Zichy Lands are both intersected by many fiords, and numerous islands lie off their coasts.

2. A continuous surface of ice extends from the one land to the other. At the time of our exploration, this expanse was formed of ice, for the most part not more than a year in growth, but crossed in many places with fissures and broad barriers of piled-up ice. Throughout its whole extent we saw many icebergs, which we never did in the Novaya-Zemlya Seas; whence it is to be inferred that they sail away in a northerly direction.[1] Our track lay over this ice-sheet. As long as it remains unbroken, every fiord might serve as a winter harbour; but if it should break up, not a single locality suitable to form one presented itself along the coasts we visited, which had no small indentations.[2]

3. The map of this country, which we present, was designed and constructed from fifteen observations of latitude, from many observations made with the azimuth compass, from drawings, and from a system of triangulation, which, from the nature of the circumstances under

[1] There are no glaciers on the coast of Siberia, and the glaciers of Spitzbergen are not, it seems, large enough to detach icebergs. May not, therefore, the icebergs which gather at Hope Island, as well as those which are met with on the northern coasts of Siberia, originate in the glaciers of Franz-Josef Land? Barentz saw, in August, 1596, on the northern coasts of Novaya-Zemlya, as many as 400 icebergs.

[2] This of course does not exclude the possibility of finding appropriate winter harbours in those Sounds we were unable to visit; most probably such occur in Markham Sound, which abounds in fiords.

which it was formed,[1] makes no pretensions to absolute exactitude. The heights of the mountains were determined by the aneroid barometer. Near the ship a base of 2170·8 métres was measured by Weyprecht and Orel and connected trigonometrically with the nearest promontories. This work of theirs formed the basis of my surveys.

4. It has always been a principle and a practice with Arctic explorers, to name their discoveries, either after the promoters of their special expeditions, or after their predecessors in the work of discovery. Though they are never likely to become important to the material interests of mankind, the naming the lands we discovered after those who promoted our expedition, was, we considered, the most enduring form by which we could express our gratitude for their efforts in furtherance of a great idea. The localities, I may add, were named during the work of surveying.

5. As I have had the privilege of visiting all the Arctic lands north of the Atlantic, I have been able to compare them and observe their resemblances as well as their differences. West Greenland is a high uniform glacier-plateau; East Greenland is a magnificent Alpine land with a comparatively rich vegetation and abundant animal life. How and where the transition between these

[1] This applies especially to the region lying to the north of 81° 10′.

opposite characters takes place in the interior is as yet utterly unknown. We may form some notion of Spitzbergen and Novaya-Zemlya, if we imagine a mountain-range, like that of the Oetzthal with its glaciers, rising from the level of the sea, if that level were raised about 9,000 feet. There is more softness, however, in both these countries than is usual in the regions of the high north. But Franz-Josef Land has all the severity of the higher Arctic lands; it appears, especially in spring, to be denuded of life of every kind. Enormous glaciers extend from the lofty solitudes of the mountains, which rise in bold conical forms. A covering of dazzling whiteness is spread over everything. The rows of basaltic columns, rising tier above tier, stand out as if crystallized. The natural colour of the rocks was not visible, as is usually the case: even the steepest walls of rock were covered with ice, the consequence of incessant precipitation, and of the condensation of the excessive moisture on the cold faces of the rock. This moisture in a country whose mean annual temperature is about – 13° R., seems to indicate its insular character, for Greenland and Siberia are both remarkable for the dryness of their cold, and it was singular that even north winds occasioned a fall of temperature in Franz-Josef Land. In consequence of their enormous glaciation, and of the frequent occurrence of plateau forms, the new lands

recalled the characteristic features of West Greenland, in the lower level of the snow-line common to both, and in their volcanic formation. Isolated groups of conical mountains and table-lands, which are peculiar to the basaltic formation, constitute the mountain-system of Franz-Josef Land; chains of mountains were nowhere seen. These mountain forms are the results of erosion and denudation; there were no isolated volcanic cones. The mountains, as a rule, are about 2,000 or 3,000 feet high, except in the south-west, where they attain the height of about 5,000 feet.

6. The later Arctic expeditions have established the existence of vast volcanic formations in the high north, and of very recent deposits in their depressions. In fact, a vast volcanic zone seems to extend from East Greenland through Iceland, Jan Mayen, and Spitzbergen to Franz-Josef Land. The geological features of the latter are at any rate in harmony with those of North-east Greenland. The tertiary Brown-coal sandstone of East Greenland is also found in Franz-Josef Land, though Brown-coal itself is met with only in small beds, which, nevertheless, may be reckoned among the many indications, that the climate of polar lands must once have been as genial as the climate of Central Europe at the present day. The kind of rock which predominates is a crystalline aggregation called by the Swedes "Hyperstenite"

(Hypersthene), identical with the Dolerite of Greenland; but the Dolerite of Franz-Josef Land is of a coarser grained texture, and of a dark yellowish green colour; according to Professor Tschermak (the Director of the Imperial Mineralogical Museum at Vienna), it consists of Plagioclase, Augite, Olivine, titaniferous-Iron and ferruginous Chlorite. The mountains of this system forming table-lands, with precipitous rocky sides, give to the country we discovered its peculiar physiognomy.

7 The Dolerite of Franz-Josef Land greatly resembles also the Dolerite of Spitzbergen. After the return of the expedition I saw in London some photographic views of the mountains of North-East Land, Spitzbergen, taken by Mr. Leigh Smith, and I was at once struck with the resemblance between their forms and those of Franz-Josef Land. I learnt also from Professor Nordenskjöld, the celebrated explorer of Spitzbergen, as I passed through Sweden, that the rock of North-East Land was this same Hyperstenite (Hypersthene). Hence the geological coincidence of Spitzbergen and Franz-Josef Land would seem to be established; and this geological affinity, viewed in connection with the existence of lands more or less known, appears to indicate that groups of islands will be found in the Arctic Seas on the north of Europe, as we know that such abound in the Arctic

Seas of North America. Gilles' Land and King Karl's Land, are, perhaps, the most easterly islands of the Spitzbergen group; for it is not probable that these and the lands we discovered form one continuous uninterrupted whole.

8. Amygdaloids, so common in Greenland, were never found by us in Franz-Josef Land; and while the rocks in the southern portions of the country were often aphanitic and so far true basalt, in the north they were coarse-grained and contained Nepheline. The other rocks consisted of a whitish quartzose sandstone, with a clayey cement, and of another finely grained sandstone, containing small granules of quartz and greenish-grey particles of chlorite, and also of yellowish finely-laminated clay slate. Erratics, so far as my opportunities permitted me to judge, were of rare occurrence; but we found many smaller pieces of petrified wood, allied to lignite.

9. Some of the islands of the Spitzbergen and Franz-Josef Land group must be of considerable extent, because they bear enormous glaciers, which are possible only in extensive countries. Their terminal precipices, sometimes more than 100 feet high, form generally the coast-lines. The colour of all the glaciers we visited inclined to grey, we seldom found the dull green-blue hue; the granules of their ice were extraordinarily large; there were few

crevasses; and the moraines were neither large nor frequent. Their movement was slow; and the snow-line commences at about 1000 feet above the level, whereas on the glaciers of Greenland and Spitzbergen the like limit is generally 2000 or even 3000 feet, and in these countries also, all below that line is free from snow in summer. Franz-Josef Land, on the contrary, appears even in summer to be buried under perpetual snow, interrupted only where precipitous rock occurs. Almost all the glaciers reach down to the sea. Crevasses, even when the angle of inclination of the glacier is very great, are much less frequent than in our Alps, and in every respect the lower glacier regions of Franz-Josef Land approach the character of the *névés* of our latitudes. There only was it possible to determine the thickness of the annual deposits of snow and ice. In these lower portions, the layers were from a foot to a foot-and-a-half thick; fine veins, about an inch wide, of blue, alternating with streaks of white, ice ran through them, which occurred with peculiar distinctness at the depth of about a fathom. On the whole, this peculiar structure of alternating bands or veins was not so distinctly marked as it is in the glaciers of the Alps, because the alternations of temperature and of the precipitations are very much less in such high latitudes.

10. The glacier ice of Franz-Josef Land was far less dense than the glacier ice of East Greenland; whence it appears, that movement, as a factor in the structure of the glacier, predominates in Franz-Josef Land more than the factor of regelation. Even at the very end of the glaciers, granules an inch long are distinctly traceable in its layers, and in the *névé* region especially the glacier-ice is exceedingly porous. The great tendency of the climate of Franz-Josef Land to promote glaciation is manifested in the fact, that all the smaller islands are covered with glaciers with low rounded tops, so that a section through them would present a regular defined segment of a circle; hence many ice-streams descending from the summits of the plateaus spread themselves over the mountain slopes and need not to be concentrated in valleys and hollows in order to become glaciers. Yet many glaciers occur—the Middendorf Glaciers, for example—whose vertical depth amounts to many hundred feet. Their fissures and the height of the icebergs show this. It was unfortunately impossible for us to explore the Dove Glacier, the largest of all we saw, owing to its great distance from the line of our route. Evaporation from the surface of the glacier goes on with great intensity during those summer months when the daylight is continual, and deep water courses show that streams of thaw-water then flow over it.

11. The comparison of the temperature of the air within the crevasses of the glaciers with the external air, invariably proved, that within the crevasses the temperature was higher. The traces of liquefaction in the glacier during winter, arising from the warmth of the earth, could not be observed, because the sides and under-edge of the glaciers were inaccessible from the enormous masses of snow, and the icicles of the terminal arches and precipices could be ascribed only to the freezing of the thaw-water of the preceding summer.

12. The plasticity of the glaciers was so great, that branches of them, separated by jutting-out rocks, flowed into each other again at their base, without showing any considerable crevasses. We could only in a few cases judge of their movement by direct measurement, and we had never more than one day to test it. One observation made on the Sonklar-Glacier in the month of March, did not seem to support the notion of the advance of the glaciers; but the repetition of similar experiments, some weeks later, made on two glaciers on the south of Austria Sound, gave the mean of two inches as the daily movement. It is very probable that their movement begins in the Arctic regions somewhat later than in our latitudes, perhaps at the end of July or beginning of August, because the period of the greatest liquefaction then ends, while it

is at its minimum in March and the beginning of April. The signs of glacier-movement were apparent in the detachment of icebergs in the month of March, but more frequently in the month of May—as at the Simony Glacier—and in the crashing in of the ice-sheet at their base in the month of April—as at the Middendorf Glacier; and the appearance of "glacier-dirt," where there is no material to furnish a moraine,—as on the Forbes Glacier—must be regarded as a sign of its onward movement or lateral extension. The infrequency of moraines may be explained by the resistance which Dolerite offers to weathering, and may also be regarded as a sign of the slow movement of the glaciers. Red snow was seen once only, in the month of May, on the precipices westward of Cape Brünn. We never met with glacier insects, although they are common in Greenland; and however diligently I looked for them I never saw unmistakable traces of the grinding and polishing of rocks by glacier action.

13. It is well known that the north-east of Greenland, as well as Novaya-Zemlya and Siberia are slowly rising from the sea, nay, that all the northern regions of the globe have for ages participated in this movement. It was, therefore, exceedingly interesting to observe the characteristic signs of this upheaval in the terraced beaches, covered with *débris* containing organic remains along

the coast of Austria Sound. The ebb and flow, which elevates and breaks up the bay-ice only at the edge, is to be traced on the shores of Austria Sound by a tidal mark of two feet.

14. The vegetation was everywhere extremely scanty, crushed, not so much by the intensity of the cold as by its long continuance, and is far below the vegetation of Greenland, Spitzbergen and Novaya-Zemlya. It resembled, not indeed in species but in its general character, the vegetation of the Alps at an elevation of nine or ten thousand feet, while the Alpine region corresponding to the vegetation of East Greenland lies a thousand feet lower. We found neither the stunted birches and willows, nor the numerous phænogamous plants of East Greenland, Spitzbergen and Novaya-Zemlya. The rare appearance of soil chiefly contributes to this extremely sparse vegetation, the detritus of the country resembling the meagre "dirt" layer on an old moraine, here and there enlivened by a small patch of green. Although we visited Franz-Josef Land at the season in which vegetation begins to stir, nowhere could there be seen a patch of sward, even a few feet square, to recall the features of our latitudes, although we examined depressions very favourably situated and free from snow. Some level spots showed patches of thin meagre grasses of *Catabrosa algida* (Fries), a few specimens of *Saxi-*

fraga oppositifolia and of *Silene acaulis*, rarely *Cerastium alpinum* or *Papaver nudicale* (L.). Thick, cushion-like tufts of mosses were more frequently discovered. There were abundance of Lichens: *Imbricaria stygia* (Acharius), *Buellia stigmatea* (Körber), *Gyrophora anthracina* (Wulfen), *Cetraria nivalis* (Acharius), *Usnea melaxantha* (Acharius), *Bryopogon jubatus* (Körber), *Rhizocarpon geographicum* (Körber), *Sporastatia Morio* (Körber)—and the *Umbilicaria arctica* of winter, which we found in Greenland at an elevation of 7000 feet. These specifications I owe to the kindness of Professor Fenzl, director of the Botanical Garden in Vienna, and of Professor Reichhardt. The museum of this institution accepted the small collection of plants I was able to bring to Europe. Of some of these there remained nothing but withered roots, so that it was impossible to determine their character. Nature in those regions, unable to deck herself with the colours of plants, produces an imposing effect by her rigid forms, and in summer by the glare of the ice and snow; and as there are lands which are stifled by the excess of Nature's gifts and blessings, so as even to defy efforts of civilization, here in the high North, another extreme is displayed—absolute barrenness and nakedness, which render it quite uninhabitable.

15. Drift-wood, chiefly of an old date, we frequently

found, but in small quantities. On the shore of Cape Tyrol, we once saw a log of pine or larch one foot thick and several feet long, lying a little above the water-line, and which might have been driven thither by the wind, as the *Tegetthoff* was. The fragments of wood we found—the branches on which showed that they did not come from a ship—were of the pine genus (*Pinus picea*, Du Roy), and must have come from the southern regions of Siberia, as the large broad rings of growth showed.

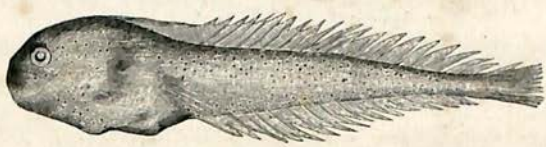
16. Franz-Josef Land is, as may be supposed, entirely uninhabited, and we never came on any traces of settlements. It is very questionable whether Eskimos would have been able to find there the means of subsistence, and if anywhere most likely on the western side of Wilczek Island, where an "ice-hole" of considerable extent remained open for a great part of the year.

17. In the southern parts it is destitute of every kind of animal life, with the exception of polar bears and migratory birds. North of Lat. 81°, the snow bore numberless fresh tracks of foxes, but though their foot-marks were imprinted on the snow beyond the possibility of mistake, we never saw one. Once we found their excrements and on Hohenlohe Island those of an Arctic hare. The scanty vegetation forbade the presence of the rein-deer and musk-ox. It is not, however,

impossible that there may be rein-deer in the more westerly parts of the country, which we did not visit. The character of that particular region approximates to that of King Karl's Land and Spitzbergen, on the pastures of which herds of these animals live and thrive.

18. Of the great marine Mammalia, seals only (*Phoca groenlandica* and *Phoca barbata*) abounded; although we saw some White Whales. Walruses we saw twice, but not close to the shore; it is, however, probable that the absence of open water prevented us from seeing the walrus nearer the shore, for the character of the sea-bottom would present no obstacle to its existence.

19. Of fish we saw only the species *Liparis gelatinosus* (Pallas) and *Gadus* which were taken with the drag-net.



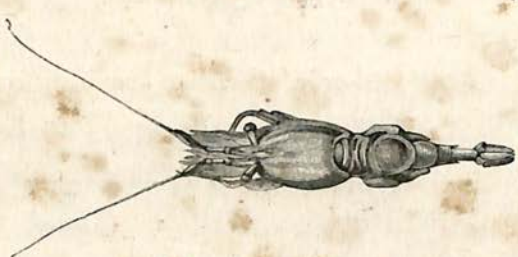
LIPARIS GELATINOSUS.

20. The birds, which we found in the region between Novaya Zemlya and Franz-Josef Land were of the following species:—the long-tailed Robber Gull (*Lestris K.*); the black Robber Gull without the long tail-feathers; the Burgomaster Gull (*Larus glaucus, B.*); the Ice or Ivory Gull (*Larus eburneus*); the Kittiwake (*Rissa*

tridactyla, L.) ; the Sea-swallow (*Sterna macrura, N.*) ; the Arctic petrel or Mallemoke (*Procellaria glacialis*) ; Ross's Gull (*Rhotostetia rosea*) ; two species of Auks (*Uria arra, P.* and *Uria Mandtii, L.*) ; the Greenland Dove (*Grylle columba,* Bp.) ; the Rotge (*Mergulus alle, V.*) ; the Lumme (*Mormon arcticus*) ; the Eider-duck (*Somateria mollisuma, L.*) ; the Snowy owl (*Strix nivea*) ; the Iceland knot (*Tringa canutus*) ; the Snow-bunting (*Plectrophanes nivalis, M.*). Most of these occurred also on the coasts of Franz-Josef-Land.

21. We can here only allude generally to those forms of animal life which were taken by the drag-net on the south of Franz-Josef Land, and brought to Europe in the collection of Dr. Kepes, and of which I made seventy-two drawings. To Professor Heller, of Innspruck, and Professor Marenzeller, of Vienna, the expedition is indebted for the naming and arrangement of those specimens, and while I refer my readers to their fuller account in the *Mittheilungen* of the Imperial Academy of Sciences of Vienna, I limit myself here to a few of the results of their observations. The investigation of the invertebrate Fauna of the sea through which we passed, was necessarily limited from the moment that the course of the *Tegetthoff* ceased to be under our control. We had, in the first place, no zoologist on board, and from the drifting ship nothing

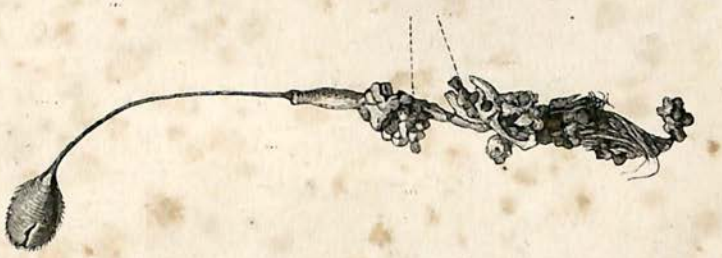
more could be done, than letting down the net almost daily during the weeks of summer—which Lieutenant Weyprecht did—and dragging it for some hours. The greater part of the animals so taken were immediately sketched by me, in order that, in the event of the loss of the original objects, some sort of representation of the animal world of a region never before investigated might be preserved. The issue justified a caution which must always be kept in view in polar expeditions.



HIPPOLYTE PAYERI.

Of the abundant shrimp-family of the Arctic seas there are four species among the collections we formed, namely :—*Hippolyte Payeri*, Heller, n. sp., *Hippolyte turgida* (Kröyer), *Hippolyte polaris* (Sabine), and *Hippolyte borealis* (Owen). The *Hippolyte Payeri* was found at the depth of 247 metres, and was of a beautiful pink colour and had blue-black eyes. There were found besides: *Crangon Boreas* and *Pandalus borealis* (Kröyer).

The group of Amphipoda was, comparatively, largely represented among the Crustacea of the Arctic waters: we often called these *Floh-krebse*—flea-crabs—because many of them used their hind legs to hop along. Eleven species of this genus were brought home in our collections; among these were *Amathillopsis spinigera*, a new species,—*Cleïppides quadricuspis*, also a new species, both described by Professor Heller—*Acanthozone hystrix* (Owen), &c. The group—Isopoda—is represented by the



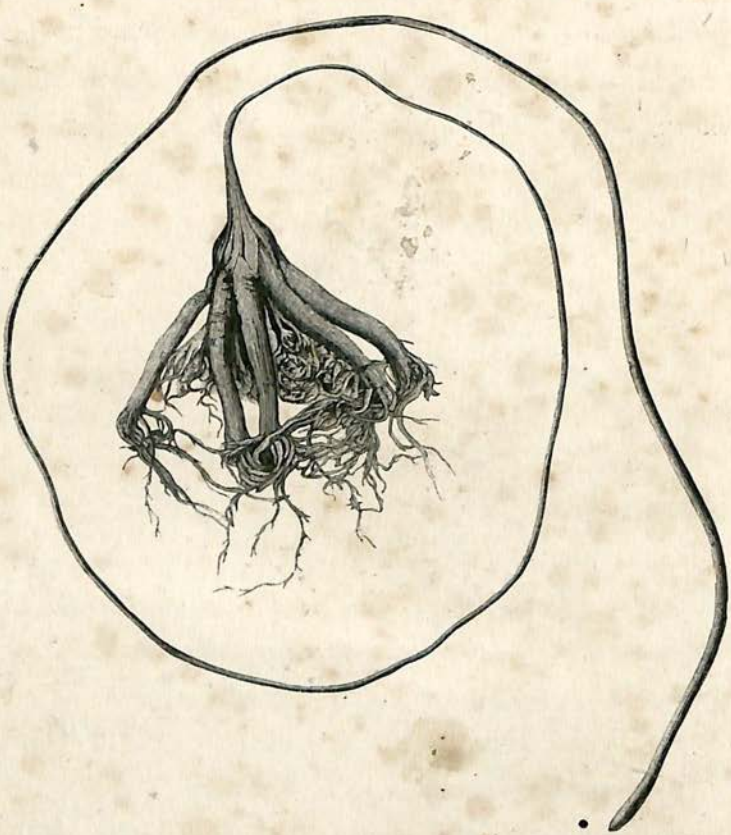
HYALONEMA LONGISSIMUM

interesting *Munnopsis typica* (Sars), the *Idothea Sabini* (Kröyer), and by a new variety, *Paranthura arctica*.

Of the group Pycnogonida, our collection contained three varieties, of which two are new.

Sponges were common; but we were obliged to leave behind the specimens of the larger kinds on account of the room they took up. Among the silicious sponges, those of the genus Hyalonema were the largest in size, and included the forms described as *Hyalonema boreale* (Lovèn) and *Hyalonema longissi-*

mum (Sars). There was one specimen of the horny sponge, so rare in those parts. The drag-net often brought up *Actiniæ*, *Bryareum grandiflorum* (Sars),



UMBELLULA.

and June 2, 1873, from a depth of 210 metres, a specimen of the extremely rare *Umbellula* described by Mytius and Ellis, 1753. Since that date this animal

had been lost sight of, until it was found again by the Swedes—Gladans Expedition 1871—in Baffin's Bay, and by the *Challenger*, 1873, between Portugal and Madeira and between Prince Edward's Island and Kerguelen's Land. It may be assumed that our Umbellula is identical with the form first described, 1758, by Linnæus as *Isis encrinus*. I regret to say that this, the most interesting of all the objects we had collected, was left behind in the *Tegetthoff*. The sketch of it made from life will facilitate a comparison with the forms known in other regions and variously named.

KORETHRASTES HISPIDUS.

Hydroid polypes, widely distributed in several varieties in the Atlantic Ocean,—*Asteridæ* and *Ophiuridæ*, the *Korethrastes hispidus* (Wyv. Thomson), a new variety discovered by the *Porcupine* expedition between the Faroe and Shetland islands, *Crinoidæ*, represented by two species never before found so far north, and several *Holothuriæ*, were also among the acquisitions brought

home. Our collection was rich in *Annelides*, containing seven-and-twenty varieties found in Greenland and

NEPHTHYS LONGISETOSA.

Spitzbergen. Fourteen varieties of *Bryozoa* were found, and single specimens of *Turbellaria* and *Gephyrea*.

CHAPTER VII.

THE SECOND SLEDGE EXPEDITION.—AUSTRIA SOUND.

1. The first sledge journey enabled me to draw up a plan for a more extended expedition towards the north. It was not only a cherished scheme of my own, but it became also the dominating interest on board the *Tegetthoff*, although the other scientific investigations were carried on uninterruptedly. Weyprecht and Brosch continued with admirable perseverance the laborious observation of the Magnetic Constants, and measured on the ice close to the ship a base of 2170·8 metres which served for all my trigonometrical surveys. The meteorological observations also were carried on with the usual regularity.

2. For some days the weather had been bad; its increasingly stormy character excited our fears, lest the ice should break up and the floe drift away with the ship. The danger of leaving her, in order to explore the extent of the new country, increased also with the

longer duration of our proposed second journey. We were convinced, too, that the sea within a few days had broken up the ice almost as far as Wilczek Island, and a heavy water-sky was seen in the south at no great distance from us. Discoveries of importance could only be expected from an expedition of a month's duration. But withal the venture must be made, and leaving the dangers and perils to the chances of the future, I gathered together the picked men who were to accompany me, to lay before them my plans. I explained to them my design of penetrating in a northerly direction as far as possible, and I put before them the danger of our being cut off from the ship. But while I showed the perils, I stimulated them also by the hope of reward. If the eighty-first degree of latitude were reached, I guaranteed to them the sum of 1,000 florins; if we attained the eighty-second degree, 2,500 florins; and I declared that merit, and merit alone, should regulate the distribution of these sums. In order to make sure of reticence on the part of my company and thus obviate ill-feeling among the rest of the crew, which might easily have been called forth by this apparent preference, they were told that the rewards would be forfeited, if any of those who stayed behind in the ship should hear of these rewards. The assembled company agreed also to my request, never to mention dangers during the journey, and, in the event of our

not finding the ship on our return, to take the whole blame of such an issue on our own shoulders. With regard to the rewards, I must add that never was secret better kept. Immediately began on board a packing, a tailoring, a preparation, as if for a campaign, and under the tent-roof of the ship the rusty runners of the sledges were polished, till they were as smooth as glass.

3. Before we started, there was an interesting interruption in the monotony of our lives, occasioned by a family of bears. While we were absent in our first journey a bear had been shot from the ship, and little Pekel had been wounded in the neck. On the 19th of March another bear came close to us, which was scared away after some unsuccessful shots had been fired at it. Three days afterwards a she-bear appeared accompanied by her two cubs, of a darker colour than their mother, rolling on after her. It was exceedingly interesting to watch the actions of this family. The mother frequently stopped and snuffed the air with uplifted snout; then she would lick her cubs, who fondly crept up to their mother, behaving exactly like young poodles, which they also resembled in size. Six shots were fired at seventy paces distance, and the mother-bear, after running for about forty paces, fell dead. Amazed at the reports of the rifles and the actions of their mother, the little bears sat as if they were rooted in the snow, and looked

with astonishment at the dark forms which rushed out from the ship. One of them suffered itself to be shaken by Pekel; and only when they were seized by the nape of the neck and carried on board did they seem to entertain the least surmise of mischief. At first they were shut up separately in casks set on their end, and

THE DOGS DIFFER AS TO THE TREATMENT OF YOUNG BEARS.

growled long and impatiently till they were put together in the same cask. Sumbu alone was slow to understand our suddenly-excited pity for his hereditary foes, and scratched and barked at the cask for hours together, while the cubs growled and threatened retaliation with their little paws. After looking at this for some time,

Gillis was moved to side with the bears, and a battle ensued between him and Sumbu, in which the latter got the worst of it. The little animals afforded us much amusement, and the crew were seriously considering the feasibility of training them to draw in the sledge, in the meditated return expedition to Europe. They eat bread, sauerkraut, bacon—in short, everything that was given them. One morning, however, the little rascals eluded the eye of the watch and got away. They were immediately caught and killed and appeared roasted on our dinner-table.

4. On the 25th of March our preparations for the extended journey northwards were brought to an end. The sledge with its load weighed about 14 cwts.

	lbs.
The large sledge	150
The dog sledge	37
The provisions, including packing	620
The tent, sleeping bags, tent-poles, alpine stocks	320
Alcohol and rum	128
Fur coats and fur gloves	140
Instruments, rifles, ammunition, shovel, two cooking-machines, drag-ropes, dog-tent, &c.	170
Total	1565

Each of the four sacks of provisions—calculated for seven days and seven men—contained 51 lbs. of boiled beef, 48 lbs. of bread, 8 lbs. of pemmican, 7 lbs. of bacon,

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2 lbs. of extract of meat, 4 lbs. of condensed milk, 2 lbs. of coffee, 4 lbs. of chocolate, 7 lbs. of rice, 3 lbs. of grits, 1 lb. of salt and pepper, 2 lbs. of peas-sausage, 4 lbs. of sugar, besides a reserve bag with 20 lbs. of bread. We took boiled beef for the dogs. We counted also on the produce of our guns as a considerable supplement both for ourselves and them.

5. The sledge party consisted of myself, Orel, Klotz and Haller, and of three sailors, Zaninovich, Sussich, and Lukinovich; and we had with us three dogs, Jubinal, Torossy, and Sumbu, and men and dogs together dragged the large sledge. The duties were thus divided: Zaninovich managed the packing and the giving out of the spirit and rum, Haller served out the provisions, Klotz attended to the dogs and the arms, Sussich was responsible for keeping everything in working order, and at night Lukinovich acted as a wind-protector close to the door of the tent. We started on the morning of the 26th of March with the thermometer 17° R. below zero, and amid snow driving from the north-west. For some distance we were accompanied by Weyprecht and the rest of the crew. We had scarcely gone a thousand paces from the ship, before the snow began to drive to such an extent, that we could scarcely see our comrades close to us and keep together. As it was impossible to go on until the storm laid, we preferred instead of

returning to the *Tegetthoff*, which would have been the simpler course, to erect the tent out of sight of the ship behind some ice-hummocks, and pass twenty-four hours in it. Our only employment except sleeping was to thaw the snow, which filled our clothes and especially our pockets. On the 27th of March (the thermometer varying between 15° and 24° below zero) we continued our journey amid a slight fall of snow, and made an early start, in order that our halt of yesterday should remain unknown to the crew of the ship. When we reached the south-eastern point of Wilczek Island we lost sight of the ship, and the driving snow with a falling thermometer increased to such an extent, that Sussich's hands were frost-bitten, and we were compelled to halt for an hour to rub them with snow. Starting again, we all ran the risk of having our faces frost-bitten, meeting as we did a strong wind. The heavily-laden sledge, too, compelled us to make such exertions that our faces were bathed in perspiration. On the 28th of March the wind fell to a calm, and as we passed over the Sound between Salm and Wilczek islands in a north-westerly direction we advanced at the rate of eighty paces a minute. The track, which we followed, consisted partly of bay-ice a year old and partly of old floes, these together forming a continuous surface, here and there broken by barriers of hummocks, miles in length, due

to ice-pressures. After we had passed the headlands south-west of Salm Island, we came in sight of the Wüllersdorf mountains, which we had hitherto seen only from a great distance, hoping from their summits to determine the route which we should take northwards.

6. At the distance of some miles right ahead of us lay several rocky islands, with their outlines scarcely discernible owing to the dull thick state of the atmosphere; but as they lay in the direction of our course, we made for them. We now passed some icebergs and saw on their southern sides the first signs of the process of liquefaction—new icicles. By and by a wind from the south-west set in, raising the temperature gradually to $-7°$ R. and bringing with it fogs and then heavy snow-storms. Covered with snow and running before the wind with a large sledge-sail set, we came under the glacier-walls of Salm Island, among icebergs frozen fast together, trudging along through wind and whirling snow. Occasionally the wind was so strong, that the sail alone sufficed to impel the heavy sledge, while a man in front, guided by a whistle from those behind, kept it in its proper course. After a march of sixteen hours, the wind having increased to a storm, which rendered it impossible to keep the track, we determined to halt. Our clothes appeared to consist of nothing but snow, our eyes were iced up, and our strength exhausted. In great

haste we erected the tent and took refuge within it; but our misery now properly began. One scraped the thawing snow from the clothes of another, or turned inside-out the pockets of his own trowsers, filled with dissolving snow-balls. At last the cooking-machine was lighted, and we began to steam, and heartily wished that our miseries had arisen from cold instead of moisture. The temperature in the tent rose at the distance of three feet from the flame to + 17° R, and twenty minutes after the production of this artificial heat it fell seven degrees below zero. Early in the morning of the 29th of March (Palm Sunday) the wind abated and the temperature rose to – 3·3° R., so that it began to rain in the tent as we were preparing our breakfast. During the march of that day we ascended the rocky heights of Koldewey Island, at the foot of which we had put up the tent for the purpose of surveying. These rocks consisted of Dolerite, over-spread with a close network of Lichens (*Cetraria nivalis*) and in the clefts we found *Silene acaulis*.

7. From the summit of this island we suddenly beheld, in the field of view of the telescope of the theodolite, a bear, which had seized Torossy and severely wounded him. But almost immediately again the bear disappeared in the snow, and when we came to the place of his disappearance, we discovered the winter retreat of a family of bears. It was a cavity hollowed out in a

mass of snow lying under a rocky wall. The bear had shown herself only once, but resisted all our efforts to seduce her to leave the shelter she had chosen, nor had we any special desire to creep on all fours into the narrow dark habitation. Sumbu only was bold enough to follow her, but he too saw things which led him to return very quickly. From the snow which had been

THE WINTER HOLE OF A BEAR.

thrown up at the entrance of this hole, we inferred that this had been the work of the bear in her efforts to close the approach to her abode. It was the first time that we came upon a family of bears in their winter quarters, or had the chance of adding anything to our scanty knowledge as to the winter sleep of those animals. Middendorff does not admit that they sleep during the winter

he considers the bear far too lean to be able to do so. According to Dr. Richardson it is only pregnant females who hibernate in a snow-hole, while the males roam over the Arctic seas in search of places free from ice.

8. As we advanced further, we went round Schönau Island[1] so remarkable for its beautiful columnar structure and environed by ice which had been raised up by pressure. In a cleft of its precipitous rocky walls we buried a depôt of provisions and a supply of alcohol for two days, together with some articles of clothing, covering them up with four feet of snow. We could not, however, conceal from ourselves the danger of placing a depôt within sight of a bear's hole, and greatly deplored, that we were not able, like the fox in the fable, to obliterate the marks of our footsteps. Towards evening the temperature fell to $-18{\cdot}5°$ R., and the tent was frozen as stiff as a board. On the 30th of March the temperature fell to $-24°$ R., and a strong north wind was blowing as we came out of the tent, and curling billows of snow, reddened by the rising sun, rolled round us, hiding from us at last even the sun himself. A march in the teeth of a wind at so low a temperature is quite useless and only exposes to the great danger of frost-bite. This was now clearly seen, when the tent being taken down as usual immediately after breakfast, the laggards,

[1] Schönau, near Teplitz in Bohemia, my birth-place.

imperfectly clad, faced the wild weather. One was binding a stocking round his face with his braces, because his frozen fingers would not permit him to button on his nose-band and wind-guard; another had put on reindeer shoes instead of boots after a vain attempt to thaw them; a third had put on the wrong boot, and I myself was obliged to wind a long rope round my body, because I was unable to fasten my coat. Such a state of things is opposed to order and safety, and may degenerate into serious mischief. There was nothing for it therefore but to set up the tent again and to get back into our sleeping-bag. But the damp tent was frozen hard, and we felt much as if we were lying between two plates of cold metal. It would be difficult to say whether we suffered more from cold than from vexation. Zaninovich spread the sail over us, and shovelled down the snow from the walls of the tent; who could be so serviceable as this comrade of ours, who on every occasion displayed such hardihood against cold? Orel and I made vain attempts to shorten the time by reading a volume of Lessing which we had brought with us; but we soon renounced the effort, finding that we could not fix our attention in such a situation. We had some compensation, however, in the amusement of listening to the Dalmatians learning to speak German with Klotz, who was far from the weakness of uttering a single

LIFE IN THE TENT.

word in Italian. As usual, when the weather was bad, the dogs gathered close to the wind-sheltered side of our tent. Sumbu forcing himself in among us had to be driven out, for he growled if he had the faintest suspicion that we meant to move or to smoke; but failing to make himself comfortable among the other dogs, he avenged himself by again rushing in amongst us, shaking the snow from his coat, and forced us to admit him.

9. On the 31st of March, the weather having cleared, we continued our journey northwards, halting as usual at noon to refresh ourselves with soup. We measured the meridian altitude of the sun with a theodolite, and surveyed and sketched our surroundings. When we came to 80° 16′ N.L. we found a broad barrier of hummocks piled one upon the other. This was succeeded by older ice, whose undulating surface was broken by numerous icebergs and high black basaltic cliffs. Here ended the possibility of determining the route to be taken; for although there was an opening between Cape Frankfurt and the Wüllersdorf mountains, we could not enter it, until we ascertained whether it led northwards. In order to settle this point Haller and I left the sledge and made a forced march to Cape Frankfurt, whence we hoped to discover the direction of our course. Meanwhile Orel and the rest of the party dragged the sledge with great exertions between hummocks and icebergs

towards the north-east. Cape Frankfurt is a promontory of Hall Island, 2,000 feet high and surrounded with glaciers. The small difference of level in the sea-ice at the base of its cliffs showed that the tide did not rise high. Its glaciers flowed towards Markham Sound and Nordenskjöld fiord. When we arrived at the summit, everything lay steeped in the rosy mists of evening. Flocks of birds flew from its massive basaltic crown, and as it was evident that they had not come there to breed, we inferred that open water was not far off.

10. Our attention was directed, however, especially to the configuration of the country, and great was our delight when we beheld beneath us a broad inlet, which promised to be of considerable extent and to run towards the north. This inlet was covered with icebergs and could be traced up to the faint outlines of a distant promontory (Cape Tyrol). It now appeared certain, that we could reach the eighty-first degree of latitude on an ice-covered sea, and the measurement of some angles furnished us with a provisional guidance for penetrating into these new regions. The coasts of Wilczek Land appeared to run in a northerly direction, and then to trend gradually to the north-east. At a great distance below us we saw a dark point moving over the dimly seen plain of sea-ice. Its advance was discernible only when for a short time it disappeared behind an iceberg, and again reappeared.

It was Orel with the large sledge; but neither the snowy mountains bathed in carmine light, which surrounded our point of view with picturesque effect, nor the crimson veils spread over them, nor the profound solitude of the wastes that lay around us, could so rivet our attention as that little point in which lodged forces apparently so insignificant, but yet made potent by human will. With pain and toil we descended the mountain in our

CAPE FRANKFORT, AUSTRIA SOUND, AND THE WÜLLERSDORF MOUNTAINS.

canvas boots between steep precipices of ice, and pressed on for six miles in the rapidly-waning light over hummocky-ice to rejoin our companions, whose position we had marked by the stars, from the elevation we had ascended. We reached our friends before midnight and our news excited great joy.

11. On the 1st of April (the thermometer marking −23° R.) we penetrated by Cape Hansa into the newly

discovered passage which was covered with heavy ice; I called it Austria Sound. The nearer we approached the coast of Wilczek Land, the more unquestionable did it appear that the Wüllersdorf mountains extended far into the interior; but it would have cost more time than the attempt was worth to ascend them. The latitude taken at noon was 80° 22′. Nothing can be more exciting than the discovery of new countries. The combining faculty never tires in tracing their configuration, and the fancy is restlessly busy in filling up the gaps of what is as yet unseen, and though the next step may destroy its illusions, it is ever prone to indulge in fresh ones. Herein lies the great charm of sledge expeditions, as compared with the tiresome monotony of life on board ship —a charm which is only then diminished when we have to wander for days over wastes of snow, with the coasts at such a distance, that they do not change sufficiently rapidly, or leave scope for indulging in surmises and fancies of what is coming. The discomforts incident to this mode of travelling are in this case doubly felt. The sledge is dragged with great difficulty in the hours of the early morning, for the hard edges of the snow crystals have not yet felt the smoothing effects of evaporation under the power of the sun. The goal itself appears as if it were never to be reached, because the limited horizon of the travellers constantly retreats. Thirst and

languor then set in. The small quantity of water which we were able to prepare during the march, had no more effect than a drop on a plate of hot iron. Klotz felt unwell to-day and cured himself by swallowing his ration of rum at one gulp. Even the dogs seemed languid, and crept along with drooping heads and their tails between their legs.

12. The land on our right was a monotonous waste of ridges and terraces of parallel raised beaches, partially covered with snow. Following its line as we marched onwards, we passed iceberg after iceberg. Towards evening I ascended one of these and made the joyful discovery that Austria Sound stretched in a northerly direction at least as far as a cape—afterwards called Cape Tyrol. In the midst of my observations Orel called to me from below that a bear was coming near us. We awaited his approach with the greed of cannibals, for his flesh would be priceless while we were making such great exertions and had only the insufficient nourishment of boiled beef. I promised Haller and Klotz the bear money of 30 gulden, usual in Tyrol, if the bear should be bagged. The animal received three shots at the same moment and at first stood stock still, but then began to drag himself slowly off. We rushed after him and to save our cartridges struck him with the butts of our rifles, and finished him by thrusting our long knives into

his body. We appropriated 50 lbs. of his flesh to our own use, and gave the rest of his carcase to the dogs, and deposited 50 lbs. of boiled beef on the ice-berg, close by which we erected our tent.

13. On the 2nd of April (the thermometer marking − 19° R.) we again started with renewed vigour though in the face of a strong north wind. I myself left the sledge in order to examine the raised beach for some distance. It was for the most part bare of snow and exhibited laminæ of brown-coal sandstone amid the Dolerite. Close beside the scanty remains of some drift-wood, I was surprised to find a circle of large stones resembling those erections which I had seen in East Greenland in deserted Eskimo villages. As, however, there were no other marked traces of former settlements, this circle of stones was no doubt something accidental. The magnitude of Franz-Josef Land seemed to grow before our eyes, as we saw the broad Markham Sound opening up towards the west, and ranges of high mountains stretching away towards Cape Tyrol. The coasts abounded in fiords, and glaciers were everywhere to be seen. Wilczek Land disappeared under ice-streams and only reappeared again in the rocky heights of Cape Heller and Cape Schmarda, opposite Wiener-neustadt Island. In the evening we reckoned that we had reached latitude 80° 42′.

14. On the 3rd of April (the thermometer standing at −16·6° R.) we should have reached Cape Tyrol, had not snow-storms from the south kept us in the afternoon in our tent: a delay with which Lukinovich was by no means displeased, for this being Good Friday he had counted on a day of complete rest,—for our friend Lukinovich was prone to turn his eyes to heaven, spoke constantly of the saints, could mention their festivals as they occurred in the calendar; but, alas! was a snow-eater and could march not a whit better than Falstaff. On the 4th of April the temperature, with constant driving storms of snow from the south, rose from −16° to −4° R.; and the snow accumulated to such an extent even in the tent, that it had to be shovelled out. It was towards the afternoon before we could continue our march, the delay made being not so much on account of the cold, as from dread of the moisture. Our start proved, however, useless, for the snow began to drive so furiously, that as we dragged, those behind could scarcely see the men in front. We again travelled by the compass and used our sledge-sail; but we constantly deviated from the right course, though we pressed on, passing Cape Tyrol without seeing it, and entered an unknown region in which we were guided by mere chance—expecting every moment to stumble on a fissure in the ice or open water. This day we sustained

a painful loss—the loss of my dog Sumbu. For two long years he had been almost our only source of amusement by his cunning and his impudence. He had long been the rival of the frolicsome Torossy, in dragging the sledge ;

HOW SUMBU WAS LOST.

and it was often almost touching to see how at evening he would sink down exhausted in the snow, in the very spot where he was unharnessed. It cannot well detract from the merit of such services—and after all they were rendered in the interests of science !— that they were

those of an animal and sprang from attachment.[1] To this vigorous lively animal, what more natural than that he should be almost beside himself if in one of these vast solitudes he should get sight of a living creature? So it happened to-day. A gull flew over his head, and Sumbu burst away from the sledge. In hot pursuit of the bird he disappeared from our sight and never returned again. All our shouts were thrown away.

CAPE EASTER AND STERNEK SOUND.

Our track was soon covered over by the drifting snow, and there cannot be a doubt that our faithful companion, after wandering about for days, either died of hunger or fell a victim to a bear.

15. April 5, after a short rest, we again started about midnight in order to economize our time (the

[1] Sumbu and Pekel were my own dogs.

thermometer being at −6° R.). The weather had greatly improved. Klotz, who was the first to step out of the tent, startled us by the information that some high land barred our further progress. But when we followed him into the open air, we found that Klotz had looked to the west instead of to the north, and we discovered the true state of things, that Zichy Land ran on our left in a northerly direction, while Wilczek Land trended towards the north-east. We pursued, therefore, our course on the vast icy-wastes, over which hung Cape Easter (81° 1′), and Cape Hellwald shining in the sun, and hoisted the flag on the sledge to celebrate our passage of the eighty-first degree of north latitude, and in commemoration of Easter Sunday.

16. During our march, spying us at a great distance, a bear approached us at a rapid pace, but when he came within forty paces he fell, receiving three bullets in his head. The accompanying illustration shows how we received bears when they attacked us on our journey; it represents also the fine froms of Cape Tyrol in the background. A few hours afterwards, we observed a she-bear about 400 yards from us, apparently diligent in burrowing in the snow; but as soon as she got wind of us she suddenly turned, reared herself on her hind-legs, and begin to snuff the air. She then came towards us, but as she advanced she rolled herself over with evident

HOW WE RECEIVED BEARS. CAPE TYEOL IN THE BACK-GROUND.

pleasure on her back several times, then pushed on with her snout and belly close to the ground, perfectly unconscious of the three rifles which were levelled at her. At fifty paces' distance we fired, and brought her down. We immediately examined the place where we had seen her so busy. We did not find poor Sumbu, as we half expected, but a partially-consumed seal, and close to it a hole in the ice, into which the creature no doubt would plunge when danger threatened; but the bear had been sharper and cleverer than the seal, and had probably seized it when asleep on the ice. Bear-flesh now formed our principal food, and the sledge was heavily laden with it. We ate it both raw and cooked, and when the flesh was badly cooked—especially if it were the flesh of an old bear—it was less palatable than when uncooked. It may be tolerable food for sea-gulls, but it is a diet hardly fit even for devils on the fast-days of the infernal regions. Arctic lands certainly do not furnish delicacies to gratify a refined taste; the best things they have to offer are coarse and oily, and if ever they are eaten with relish, it is a relish which comes from hunger alone. The desolate shores of these lands are truly the very home of hunger, and nowhere else are the calculations of travellers so much influenced and determined by the stomach and its needs. Remains or fragments are unknown in Arctic regions. The dead are consumed

by the living, and the living find their never-ceasing occupation in the toilsome search for food. In my three Arctic expeditions, I very seldom indeed found the remains of animals, never the remains of a bear or a fox. The man who visits these wastes must do homage to the principle of eating everything, and throwing away

DINING ON BEARS' FLESH.

nothing. Franklin was unsurpassed in this, but I believe we were little behind him. Franklin and his people found the flesh of a white fox as pleasant to the taste as young geese—a proof how entirely they had forgotten how geese taste. They preferred foxes, too, to lean reindeer; and they considered the flesh of a grey bear exceedingly palatable, though even the

Eskimos eat it only in dire necessity. Reindeer marrow, even raw, was to them a great delicacy, and they ate animals in a state of decomposition. Barentz and his crew were very modest in their tastes; they compared whale-flesh to beef, and foxes to rabbits, as articles of diet; bears' meat they utterly detested. Once only it seems they partook of the liver of a bear, and three of his men became exceedingly ill in consequence, their skin peeling off from head to foot. Kane was prejudiced against bear, notwithstanding the great straits to which he was reduced, and complains of this food as being absolutely uneatable. The testimony of Dunér is more favourable. "If," says he, "a bear has not been eating walrus or seal in a state of semi-putrefaction before he is killed, his flesh, though somewhat coarse, is yet palatable, and not at all prejudicial to health." Parry thought whale-flesh and walrus-flesh equally distasteful: he makes an exception in favour only of the heart of the walrus; but he speaks of the tenderness and excellence of the flesh of young seals. As for ourselves, we disdained nothing that we could get hold of, after the manner of Sir John Ross, who thought the fox the best of all food, better than the gull (*Larus trydactylus*).

17. The continued moisture of the last few days had completely saturated our canvas boots; and those of several

of us were besides nearly worn out, and in the morning when completely frozen, to put the foot into one was as bad as putting it into an ice-hole, so that we were obliged to thaw them over a spirit-flame, and to knock their heels with a hammer continually during the march. Sussich had made himself a pair of new boots out of a cloth jacket. It would, however, be a mistake to think that we should have been any better off with leather boots. In fact, we could not have put them on, and in the increasing cold of the following weeks our feet would certainly have been frost-bitten. Our clothes were completely saturated in like manner, and whenever the temperature fell they became stiff with ice. I suffered the least of any, for my bird-skin garments were the best preservatives against the penetration of moisture.

18. No kind of snow opposes such hindrances to sledge-dragging as the snow with the thermometer not much below freezing-point, for at this temperature it balls. This impediment we now encountered. The air, too, became oppressively heavy; land and sky were suddenly overspread with darkness; and from behind thunder-like clouds red rays of the sun fell on the conical mountains of Kane Island. Falls of snow, calms, and violent gusts of wind rapidly succeeded one another, and just before we erected our tent it again became clear. Far to the north we saw two white masses—Becker and

Archduke Rainer Islands, and an extensive inlet—Back Inlet; but only within Austria Sound could we count on pursuing our journey northwards without making any detours. On Easter Monday, April 7th (the thermometer varying between 7° and 15° below zero), we approached Becker Island; but the atmosphere was on this day so moist and thick, though without mist in the proper sense, that its existence might be asserted or disputed according as the light changed; and it was only when we were not further off than 100 paces, that we could be positive of the existence of land, rising gently at an angle of 1° 7′. Over this ice-covered island we now dragged, and, full of expectation, mounted its highest point. To the north lay an indescribable waste, more utterly desolate than anything I had ever seen, even in the Arctic regions, interspersed with snow-covered islands, all, big and little, of the same low, rounded shape. The whole, at a distance, presented the appearance of a chaos of icehills and icebergs scattered over a frozen sea. One thing only in this view gave us much satisfaction. Austria Sound still stretched uninterruptedly towards the north. Could we have forgotten how the *Tegetthoff* had drifted towards Franz-Josef Land, that Sound would have seemed to us the true road to the Pole. Nor could we doubt, that in the immediate north open water would be found, for in no other way could we interpret

the indications we had observed in the course of the last few days—the great moisture and high temperature, the dark colour of the northern sky, the frequent flights of Auks, and Divers, grey and white Gulls, which flew from the north southward, or *vice versâ*.

19. After crossing Becker Island, we went on again on the frozen sea, which was rough and undulating for some distance. From behind one of the hummocks a bear suddenly emerged, and came towards us without any fear or hesitation, his yellow colour forming a strong contrast with the gleaming hills of ice. When he was thirty paces off we fired; but though severely wounded he managed to get away. On the 7th of April (the thermometer varying between 13° and 20° below zero, and with a light south-west wind), we passed close to Archduke Rainer Island, a heavy rime frost seriously impeding our progress. We were able, however, to turn to good account the clear sunny weather of this day. We dried our clothes and tent furniture, spreading them out in the sun over the sledge or suspending them to its mast and yard. We had almost reached Cape Beurmann at noon, and having taken our observations, we found our latitude to be 81° 23′. We had consequently gone beyond the latitude reached by Morton; Hayes only having reached a slightly higher latitude than this. About this time of the day the horizon towards the north became exceedingly clear, and the steep rocks

of Coburg Island were distinctly visible, and behind them now rose the faint outlines of mountains—Crown-Prince Rudolf's Land.

20. At this latitude it seemed as if Wilczek Land suddenly terminated, but when the sun scattered the driving mist we saw the glittering ranges of its enormous glaciers —the Dove[1] Glaciers—shining down on us. Towards the north-east we could trace land trending to a cape lying in the grey distance—Cape Buda Pesth as it was afterwards called. The prospect thus opened to us of a vast glacier-land, conflicted with the general impression we had formed of the resemblance between the newly discovered region and Spitzbergen; for glaciers of such extraordinary magnitude presuppose the existence of a country stretching far into the interior. As it appeared to us that Crown-Prince Rudolf's Land and Karl Alexander's Land formed a continuous whole, we left Austria Sound and diverged into Rawlinson Sound, and directed our course towards Cape Rath. It was my intention, if this headland should be reached, to leave behind the remainder of the party and push on with the dog sledge and two companions. We could count on finding deep snow wreaths behind the hummocks, and to dig out a snow house would have been the labour of an hour for three men. Previous experience had

[1] Named after Dove the celebrated German physicist.

convinced us that such a night encampment is warmer than the shelter which a tent can afford. But though we were filled with zeal to extend our discoveries as much as possible, we now felt that the excessive exertions we had made had reduced our strength. We had slept on an average but five hours a day, and marched the rest of the day, or at any rate had been occupied with all manner of work. Our appetite too had increased with our labours, and the partaking of bear's flesh began to tell on some of us. The restricted use of bread-stuff was especially felt, and the almost exclusive use of flesh produced diarrhœa and general debility. Nothing is more prejudicial to those engaged in extended sledge journeys than great exertion with insufficient sleep. The urgent reasons we had for losing no time in order that we might return as soon as possible to the ship, constrained us to depart from the rule of a ten hours' sleep to a seven hours' march on sledge journeys. In consequence of our persistent adherence to this principle during our return to Europe after abandoning the *Tegetthoff*, the labours incident to it were far more easily performed. We did not lose but gain strength, and some of us even grew stouter during it.

21. On the 8th of April we continued our journey, making an early start as usual. Our track lay between countless hummocks, some of which were forty feet high,

while the depressions between them were filled with deep layers of snow, and as we advanced into Rawlinson Sound, high icebergs towered over a monotonous chaos of ice-forms. The ice resembled that which surrounded the *Tegetthoff* during our first winter and indicated a periodical, perhaps even an annual, breaking up. There was nothing, however, to entitle us to infer, that Rawlinson Sound was navigable in summer. Like many of the passages of the northern coast of North America, Austria and Rawlinson Sound are too narrow for the purposes of navigation. They are, however, well calculated for sledge travelling. For some time we made use of our sledge sail; but when the wind shifted to E.S.E., it drove the sledge so much from its true course, that we took it down. Our noses had become so susceptible, that we were glad to put on our wind-protectors to save them from frost-bite. Then followed snow-storms, alternating with brilliant sunshine which, however, illuminated, partially only, some reaches of the hummocky ice, while the distant land lay in shadow. It cost us excessive labour to get the sledge on; we had occasionally to dig a lane for it, and we ran some risk of breaking it. Our advance was one continual zig-zag, due to the confused character of the ice on which we travelled and the untrustworthiness of the compass in high latitudes. It seemed too, as if the declination of

the magnetic needle had considerably diminished since we left the ship. Our labours were diversified by the visit of a bear, who, when we first observed him, was standing on the top of one of the many ice-hummocks about 300 paces distant. He then approached us, as was

CUTTING UP THE BEARS.

usually the case, under the wind, and we at once drew up to receive him. He took no notice of the bread we had laid down to gain his attention, but still pressed on till he received three bullets in his head. Notwithstanding this he ran for about seventy yards and then fell. To make sure another bullet was fired into his body, and

thinking him dead we forthwith began to cut him up; but when his belly was being opened, he raised his head in a fury, seized the butt end of my rifle with his teeth and tore it from my hand. My companions soon despatched him. The bear was eight feet long and therefore of unusual size. We might have cut off two or three cwt. of flesh from his carcase, but in consideration of the heavy lading of the sledge, we contented ourselves with appropriating sixty pounds. Both Rawlinson and Austria Sound were equally rich in fresh traces of bears, which seemed to be those of whole families and not of individual animals.

22. Our latitude from a meridian observation was found to be 81° 38′—and though the sun shining dimly through the clouds might account for an error of two or three minutes, we had certainly passed beyond the latitude 81° 35′ reached by Hayes in Smith's Sound in 1861.[1] Having no conception at the time that Hall's American expedition had penetrated, the year before we achieved this result, to 82° 9′ on the land and 82° 22′ at sea, we hoisted our sledge flag to commemorate our success. The character of the ice now became so wild and confused that we wandered 45° from one point of the compass to the other. We constantly expected to come

[1] Parry reached on the frozen sea to the north of Spitzbergen, 82° 45′ N.L.

upon open fissures, and could not conceal from ourselves how easily its loose connection might be broken up by a storm, and our return to the ship exposed to great risks. The transport of our travelling gear became increasingly difficult, and great were our fears lest through the constant heavy shocks which the sledge encountered the case of spirit should be crushed and destroyed. The difficulties too to be overcome amid the multitude of hummocks were more depressing than the occurrence of snow-storms, inasmuch as their number almost destroyed the possibility of progress, and the monotonous uniformity which tired the eye tended also to depress the spirits.

23. On the 9th of April (the thermometer standing at $-10°$ R., and a light breeze blowing from the east) we continued our work of dragging between the hummocks till noon. We then ascended an iceberg and discovered that the hummocks of ice in Rawlinson's Sound appeared to stretch on without end. We therefore altered our course and took a north-westerly direction in order to come under Crown-Prince Rudolf's Land, whose noble mountain forms and mighty glaciers shone forth in the light of the sun. We expected to find smoother ice on its coast-line; but we were deceived in this expectation, for the character of the ice remained unchanged. We were compelled therefore to cross this Sound in a westerly direction to Hohenlohe Island, and

to select the rocky pyramid—visible from a great distance —of Cape Schrötter as the point where our expedition should divide into two parties ; the larger party to remain behind, the smaller to penetrate further towards the north over the glaciers of Rudolf's Land. By noon of this day we reached 81° 37′ N.L. and in the evening arrived at Cape Schrötter. All the labours and efforts of the last few days had consequently been without result.

CHAPTER VIII.

IN THE EXTREME NORTH.

1. IMMEDIATELY after reaching Cape Schrötter, the east end of Hohenlohe Island, we ascended the summit of this Dolerite rock, which was quite free from snow, and covered with a sparse vegetation. We were surprised to find here the excrement of a hare. The prospect which lay before us convinced us of the necessity of our proposed temporary separation. The mountains of Crown-Prince Rudolf's Land, separated from us by an arm of the sea covered with level ice, were so high (about 3000 feet) that we saw at once that we could pass over them only with the small dog-sledge. The walking powers, moreover, of two of my companions had greatly deteriorated, and for them rest was not an indulgence, but a necessity. Austria Sound appeared to stretch still further to the north, but its western coasts turned sharply to the left in the precipitous cliffs of Cape Felder and Cape Böhm. The blue jagged line of

mountains, towering above snowfields lying in the sun, stretched away to the north-west, till they were lost in dark streaks on the horizon, which our experience led us to interpret as a water-sky above open spaces of the sea.

2. I was greatly delighted by Orel's readiness, though he was suffering from inflamed eyes, to take part in the expedition to the extreme north; and it only remained for us to select the fittest among the party and to calm the apprehensions of those who were to remain behind. On our return to the foot of the rocks, where the tent was already pitched, we found the rest of the party sitting close to each other at the rocky wall, on which the sun was shining, in order to warm themselves,—like crickets on the wall of a house. The success of an expedition like that we projected depends chiefly on the mutual good feeling among its members, and he who commands it, besides participating personally in all the labours to be endured, must show himself a sympathetic friend even in cases where strict duty does not enjoin it, so that confidence in him may grow into a kind of belief in his infallibility. There could not be more devoted or enduring men than those who were here lying in the sun, and whom we now joined, in order to decide the question of the hour. I explained to them the plans I meant to follow, that I should be absent from five to

eight days, that, if I should not return to them within fifteen days they should march back to the ship with the sledge—sawn through the middle—and the stock of provisions which should be placed at their disposal would suffice for this emergency. I then asked each of them whether he could dismiss fear, and remain behind in this desolation. Sussich answered: "*Se uno de lori resta indietro, mi non go paura:*" so said the rest. By the expression, however, "uno de lori" they meant Orel or one of the two Tyrolese, and specially with an eye to the bears which might be prowling about. I left it free to Klotz and Haller to decide which of them was the fittest and most serviceable to accompany me: "You," answered Haller, "you, Klotz, are the better man in dragging the sledge and enduring fatigue." Accordingly Sussich and Lukinovich remained under Haller's command. These three were ordered not to go more than 300 yards from Cape Schrötter, to remain on the defensive if attacked by bears, to spend their time in drying their clothes and repairing their torn boots, and to go about in wooden shoes to save wear and tear. Haller received as Governor of Hohenlohe Island a pocket-compass, a watch, an aneroid barometer, and a thermometer, and to them we left also our little medicine-chest. If Dr. Kepes had once tried to make a doctor of me in one hour, in now repeating

the experiment on Haller I confined myself to ten minutes.

3. On the morning of the 10th of April (the thermometer standing at −12° R.) we divided the tent; one half was put on the dog-sledge, the other was pitched, with its open side close under the rock. Before a caravan takes the desert, the camels are watered, and we too, though in a very different kind of desert, exposed to the constant evil of thirst, would gladly have been treated in like fashion. But we had to content ourselves with a pint of boiling water, served out to each of us every morning, reminding us, indeed, of coffee, for two lbs. of it were boiled in 105 gallons of water in the course of thirty days. The provisions were divided, and enough for eight days was dealt out to the party starting to the north, Orel, Zaninovich, Klotz, myself, and two dogs. The special requirements of our expedition, among which were a rifle and a revolver, raised the weight of our sledge to about 4 cwt., which it was the business of the dogs to draw without any assistance from us, and this they did over the level snow with such zeal, that we had some trouble in keeping up with them.

4. The merits of our dogs I have hitherto left unnoticed, in order emphatically to assert that we owed the passing beyond the eighty-second degree of north

latitude not to our own exertions but to the endurance and courage of these animals. No kind of life among dogs is comparable for hardships with the life of a dog in an Arctic sledge. His tent is scarcely the pretext of a shelter, and his natural coat is generally covered by a thick rime. The snow when it drifts, completely covers him, though he constantly but vainly seeks to shake it off. He draws his breath with difficulty, hunger gnaws at his bowels, and his wounded feet colour the snow with blood. Often, too, these poor animals amid the great cold must keep still; then they lift up their paws alternately, to prevent frost-bite. The two dogs, which accompanied us to the extreme North, were the noblest animals ever employed in a sledge expedition, and when I recall the great services they rendered us, both now and afterwards in the return to Europe, their sad end fills me with sincere sorrow. Jubinal and Torrosy were dogs of remarkable size and strength, and escaped the epidemic diseases[1] which attacked the dogs of Hayes and Kane, and though it has been thought that the dogs of the Eskimo and of

[1] Kane's dogs died principally in consequence of being fed chiefly on salt meat, and Hayes's from a disease among dogs which spreads over all West Greenland. Epidemics of this kind break out among the dogs of the Eskimos and of the Siberian tribes. Middendorf mentions, however, that canine madness never occurs among the dogs of the latter.

the Siberian people were alone adapted for Arctic expeditions, our experience with our own dogs, most of them brought from Vienna, proves that they were not a whit less useful. Our dogs had only one defect: they had not been trained to sledge-drawing from their youth, but had been broken to it only during our expedition, and were therefore not always amenable to discipline. When left to themselves in dragging the sledge they went on, without turning to the right or left, from cape to cape, and if they found themselves on a wide plain of ice, and far from all striking landmarks, they ran either towards the sun or the moon, or some remarkable star. It was against the grain with them to have to drag in the teeth of the wind, and if they had to push on amid hummocks of ice, they immediately began to growl. They were fed in the morning, and more particularly in the evening, and they showed a delicacy of taste in discriminating between bear's flesh and the despised seal's flesh. While they carefully avoided coming near us before our start, provided they were not very hungry, in order to escape being harnessed, yet when harnessed nothing could exceed their vigour and persistence in dragging.

5. As we approached the promontory on the south of Crown-Prince Rudolf's Land, we came upon innumerable icebergs, from one hundred to two hundred feet high, which made an incessant cracking and snapping sound

in the sunshine. The Middendorf glacier, with an enormous sea wall, ran towards the north to a great distance. Deep layers of snow and great rents in the sea-ice, the consequence of the falling-in of icebergs, filled the intervening spaces between them. Into these fissures we were continually falling, drenching our canvas boots

ICEBERGS AT THE BASE OF THE MIDDENDORF GLACIER.

and clothes with sea-water. But the aspect of these colossal fragments of glaciers engrossed us to such an extent, that we wandered a long time with unflagging interest among these pyramids, tables, and cliffs. It was only when I sent on Klotz to mark out by his footsteps a path by which we might ascend the Middendorf glacier, that we came to a more open region, and all putting their

strength to the work of dragging, we gained its summit, crossing in our progress many crevasses bridged over with snow. Three of these yawned across the lower part of the glacier, needing but a slight movement of the ice to detach them and transform them into icebergs. Further on, the glacier appeared smooth and free from crevasses, although its inclination amounted to several degrees. Towards the north it seemed as if it might be crossed without excessive exertion, if all took part in the work of dragging. But before we began this part of the day's work we rested and recruited ourselves with dinner, and setting up our little tent at about 400 paces above the edge of the glacier, we looked down with feelings of delight on its semicircular terminal precipice and the gleaming host of icebergs which filled the indentations of the coast. While we were sitting in the tent Klotz made the fatal communication to me, that he was not the man he should be, that for some days his foot had swollen and ulcerated, so that he could walk only in shoes made of hide. However vexatious this mishap, there was nothing for it but to send him back to Hohenlohe Island. Laden with a sack and carrying a revolver, he set off, and soon disappeared from our eyes in the labyrinth of icebergs beneath us.

6. We had meanwhile again packed the sledge, harnessed the dogs, and fastened the traces round us, when,

just as we were setting off, the snow gave way beneath the sledge, and down fell Zaninovich, the dogs, and the sledge, and from an unknown depth I heard a man's voice mingled with the howling of dogs. All this was the impression of a moment, while I felt myself dragged backwards by the rope. Staggering back, and seeing the dark abyss beneath me, I could not doubt

THE SLEDGE FALLS INTO A CREVASSE ON THE MIDDENDORF GLACIER.

that I should be precipitated into it the next instant. A wonderful providence arrested the fall of the sledge; at a depth of about thirty feet it stuck fast between the sides of the crevasse, just as I was being dragged to the edge of the abyss by its weight. The sledge having jammed itself in, I lay on my

stomach close to the awful brink, the rope which attached me to the sledge tightly strained, and cutting deep into the snow. The situation was all the more dreadful as I, the only person present accustomed to the dangers of glaciers, lay there unable to stir. When I cried down to Zaninovich that I would cut the rope, he implored me not to do it, for if I did, the sledge would turn over, and he would be killed. For a time I lay quiet, considering what was to be done. By and by it flashed into my memory, how I and my guide had once fallen down a wall of ice in the Ortler Mountains, 800 feet high, and had escaped. This inspired me with confidence to venture on a rescue, desperate as it seemed under the circumstances. Orel had now come up, and although he had never been on a glacier before, this gallant officer dauntlessly advanced to the edge of the crevasse, and, laying himself on his stomach, looked down into the abyss, and cried to me, "Zaninovich is lying on a ledge of snow in the crevasse, with precipices all round him, and the dogs are still attached to the traces of the sledge, which has stuck fast." I called to him to throw me his knife, which he did with such dexterity, that I was able to lay hold of it without difficulty; and as the only means of rescue, I severed the trace which was fastened round my waist. The sledge made a short turn, and then stuck fast again.

I immediately sprang to my feet, drew off my canvas boots, and sprang over the crevasse, which was about ten feet broad. I now caught sight of Zaninovich and the dogs, and shouted to him, that I would run back to Hohenlohe Island to fetch men and ropes for his rescue, and that rescued he would be, if he could contrive for four hours to keep himself from being frozen. I heard his answer: "Fate, Signore, fate pure!" and then Orel and I disappeared. Heedless of the crevasses which lay in our path, or of the bears which might attack us, we ran down the glacier back to Cape Schrötter, six miles off. Only one thought possessed us—the rescue of Zaninovich, the jewel and pride of our party, and the recovery of our invaluable store of provisions, and of the book containing our journals, which, if lost, could never be replaced. But even apart from my personal feeling for Zaninovich, I keenly felt the reproaches to which I should be exposed of incautious travelling on glaciers; and it gave me no comfort to think that my previous experiences in this kind of travelling over the glaciers of Greenland appeared to justify my proceedings. Stung with these reflections, I pressed on at the top of my speed, leaving Orel far behind me. Bathed in perspiration, I threw off my bird-skin garments, my boots, my gloves, and my shawl, and ran in my stockings through the deep snow. After

passing the labyrinth of icebergs I saw the rocky pyramid of Cape Schrötter before me in the distance. The success of my venture depended on the weather. If snow-driving should set in, and footprints should be obliterated, it would be impossible to find Hohenlohe Island. All around me it was fearfully lonely. Encompassed by glaciers, I was absolutely alone. At last

KLOTZ'S AMAZEMENT.

I saw Klotz emerge from behind an iceberg at some distance off, and though I continued to shout his name till I almost reached him, I failed to rouse him from his usual reverie. When at last he saw me breathlessly pushing on, scarcely clothed, and constantly calling, his sack slipped from his back, and he stared at me as if

he had lost his senses. When the hardy son of the mountains came to understand that Zaninovich with the sledge was buried in the crevasse, he began to weep, in his simplicity of heart taking the blame of what had happened on himself. He was so agitated and disturbed, that I made him promise that he would do himself no mischief, and then, leaving him to his moody

THE ALARM OF THE HOHENLOHE PARTY.

silence, I ran on again towards the island. It seemed as if I should never reach Cape Schrötter; with head bent down I trudged on, counting my steps through the deep snow; when I raised it again, after a little time, it was always the same black spot that I saw on the distant horizon. At last I came near it, saw the tent, saw some dark spots creep out of it, saw them

gather together, and then run down the snow-slope. These were the friends we had left behind. A few words of explanation, with an exhortation to abstain from idle lamentation, were enough. They at once detached a second rope from the large sledge, and got hold of a long tent-pole. Meantime I had rushed upon the cooking-machine, quickly melted a little snow to quench my raging thirst, and then we all set off again—Haller, Sussich, Lukinovich, and myself—to the Middendorf glacier. Tent and provisions were left unwatched; we ran back for three hours and a half; fears for Zaninovich gave such wings to my steps, that my companions were scarcely able to keep up with me. Ever and anon, I had to stop to drink some rum. At the outset we met Orel, and rather later Klotz, both making for Cape Schrötter, Klotz to remain behind there, and Orel to return with us at once to Middendorf glacier. When we came among the icebergs under Cape Habermann I picked up, one by one, the clothes I had thrown away. Reaching the glacier, we tied ourselves together with a rope. Going before the rest, I approached with beating heart the place, where the sledge had disappeared four hours and a half ago. A dark abyss yawned before us; not a sound issued from its depths, not even when I lay on the ground and shouted. At last I heard the whining of a dog, and

then an unintelligible answer from Zaninovich. Haller was quickly let down by a rope; he found him still living, but almost frozen, on a ledge of snow forty feet down the crevasse. Fastening himself and Zaninovich to the rope, they were drawn up after great exertion. A storm of greetings saluted Zaninovich, stiff and speechless though he was, when he appeared on the surface of the glacier. I need not add that we gave him some rum to stimulate his vital energies. It was a noble proof how duty and discipline assert themselves, even in such situations, that the first word of this sailor, saved from being frozen to death, was not a complaint, but thanks, accompanied with a request that I would pardon him if he, in order to save himself from being frozen, had ventured to drink a portion of the rum, which had fallen down in its case with the sledge to his ledge of snow. Haller again descended, and fastened the dogs to the rope. The clever animals had freed themselves from their traces in some inexplicable way, and had sprung to a narrow ledge, where Haller found them, close to where Zaninovich had lain. It was astonishing how quickly they discerned the danger of the position, and how great was their confidence in us. They had slept the whole time, as Zaninovich afterwards told us, and he had carefully avoided touching them, lest they should fall down deeper into the abyss. We drew them up

with some difficulty, and they gave expression to their joy, first by rolling themselves vigorously in the snow, and then by licking our hands. We then raised Haller by the rope some ten feet higher than the ledge on which Zaninovich had lain, so that he might be able to cut the ropes which fastened the loading of the firmly wedged-in sledge. At this moment Orel arrived, and with his help we raised one by one the articles with which the sledge was loaded. It was ten o'clock before we were convinced that we had lost nothing of any importance in the crevasse.

7. We now left the glacier and the icebergs, and by midnight had reached Cape Habermann. Here we slept, and the dogs with us, as uncomfortably as possible. On the morning of the 11th of April (the thermometer marking −13°·3 R.), we started at an hour when we would much rather have continued to sleep. Our thirst was so great that we felt ourselves equal to drinking up a stream. Haller, Sussich, Lukinovich had during the night returned to Cape Schrötter. Before they started Haller earnestly besought me to come back as soon as possible; for the recent event, he said, had not been without its disquieting effects on the men. On the whole, we might congratulate ourselves on being able to continue our journey, without having received any serious damage, though no longer over the treacherous glacier.

8. A sharp turn to the left brought us to the west coast of Crown-Prince Rudolf's Land, along which we pursued our route northwards. When we reached Cape Brorok, where by an observation we found our latitude at noon to be 81° 45′, the weather became wonderfully bright, and the warm sunlight lay on the broken summits of the Dolerite mountains, which, though covered with gleaming ice, were free from snow. To the north-west we saw at first nothing but ice up to the horizon; even with the telescope of the theodolite I could not decide for the existence of land, which Orel's sharp eye discovered in the far distance. In the Arctic regions, it often happens that banks of fog on the horizon assume the character of distant ranges, for the small height to which these banks rise in the cold air causes them to be very sharply defined. It is very common also to make the same mistake in the case of mists arising from the waste water of enormous glaciers. We marched on northward close under the land, and for the first time over smooth undulating ice, in high spirits at the increasing grandeur of the scenery and at the happy issue of our adventure of yesterday. Thirst compelled us frequently to halt in order to liquefy snow ;[1] sometimes we melted it as we

[1] Snow-water was for two years the only water we used, and as none of us became goitred, we were a living refutation of the opinion shared by many that its constant use generates this disease in the inhabitants of the Alps.

marched along, and our sledge with smoke curling up from the cooking-machine then resembled a small steamer.

9. By and by we came to more snow, and the ice, through which many fissures ran, became gradually thinner, but when we reached the imposing headland, which we called Cape Auk, the ice lay in forced-up barriers. A strange change had come over the aspect of

HALT UNDER CROWN-PRINCE RUDOLF'S LAND.

nature. A dark water-sky appeared in the north, and heavy mists rolled down to the steep promontories of Karl Alexander Land; the temperature rose to − 10·1° R.,[1] our track became moist, the snow-drifts collapsed under us with a loud noise, and if we had previously been surprised

[1] On board the ship the temperature at the same time was − 23° R.

with the flight of birds from the north, we now found all the rocky precipices of Rudolf's Land covered with thousands of auks and divers. Enormous flocks of birds flew up and filled the air, and the whole region seemed alive with their incessant whirring. We met everywhere with traces of bears and foxes. Seals lay on the ice, but sprang into the water before we got within shot of them. But notwithstanding these signs of a richer animal life, we should not be justified in inferring, from what we saw in a single locality, that life increases as we move northwards. It was a venial exaggeration, if amid such impressions we pronounced for the nearness of an open Polar sea, and without doubt all adherents of this opinion, had they come with us to this point and no further, would have found in these signs fresh grounds to support their belief. In enumerating these observations, I am conscious what attractions they must have for every one who still leans to the opinion that an open ocean will be found at the Pole; subsequent experience, however, will show how little is their value in support of this antiquated hypothesis.

10. Our track was now very unsafe; it was only the icebergs which seemed to keep the ice in the bays. A strong east wind would certainly have broken it up and cut off our return, at least with the sledge. There were no longer the connected floes of winter,

but young ice only, covered with saline efflorescence, dangerously pliable, and strewn over with the remains of recent pressures. The ice was broken through in many places by the holes of seals. It was expedient therefore to tie ourselves together with a long rope, and each of us, as he took his turn in leading, constantly sounded the ice. Passing by Cape Auk, which resembled a gigantic aviary, we followed the line of Teplitz Bay, into which a stream of glaciers, descending from high mountains in the interior, discharged itself. Icebergs lay along the terminal glacier wall which formed its shore. Ascending one of these masses, we found granite erratics on its surface and saw the open sea stretching far to the west. There seemed to be ice only on the extreme horizon. As the ice sheet over which our track lay became thinner and more pliable, and constantly threatened to give way under us, the height and length of its piled-up barriers increased also, and because the high glacier walls made it impossible to travel over the land, we had no other resource than to open up a track through the hummocky ice by pick and shovel. At last even this expedient failed to help us; our sledge, constantly damaged, and as constantly repaired, had to be unloaded, the dogs unharnessed, and everything transported separately. Evening had now arrived; ahead of us lay the

two rock towers, which we called Cape Säulen, and open coast water here began.

11. Beautiful and sublime was this far-off world. From a height we looked over a dark "ice-hole," studded with icebergs like pearls, and over these lay heavy clouds through which the sunbeams fell on the gleaming water. Right over the true sun shone a second, though somewhat duller sun; the icebergs of Crown-Prince Rudolf's Land, appearing enormously high, sailed through the still region amid rolling mist and surrounded by vast flocks of birds. Close under Cape Säulen (the Cape of Columns) we came upon the steep edge of the glaciers and dragged up our baggage with a long rope. While Orel got ready our encampment for the night in the fissure of a glacier, and completed as usual his meteorological observations and soundings, I ascended a height to reconnoitre our track for the next day. The sun was setting amid a scene of majestic wildness; its golden rays shot through dark banks of mist, and a gentle wind, playing over the "ice-hole," formed ever-widening circles on its mirror-like surface. Land was no longer visible towards the north, it was covered with a dense "water-sky." A bird flew close past me; at first I took it for a ptarmigan, but it was probably a snipe. It ought to be remarked that during the two days which we spent near this "ice-hole" we never once saw a whale.

CAPE SÄULEN.

As soon as with half-closed eyes we had eaten our supper, we fell fast asleep, for our longing to sleep was yet greater than our exhaustion and our thirst. The dogs availed themselves of this opportunity to devour several pounds of bear's flesh and empty a tin of condensed milk, which, however, did not prevent them from barking impudently the next morning for more.

12. The 12th of April was the last day of advance in a northerly direction. Though the weather was not clear, yet it was clearer than it had been for some time. When we started we buried our baggage in the fissure of the glacier where we had slept, in order to protect it from bears, which roamed about on all sides. Our march lay over snowy slopes to the summits of the coast range—from 1,000 to 3,000 feet high. The masses of mist lying on the horizon had retreated before the rays of the morning sun, and all the region with its lines of ice-forms was bathed in light; and southward, open water stretched to the shores of Cape Felder. As we followed this lofty coast range, mountains with glaciers sloping down their sides towards the sea seemed to rise before us. An hour before noon we reached a rocky promontory 1,200 feet high, afterwards called Cape Germania. Here we rested, and from a meridian observation we found our latitude to be 81° 57′. Following the coast as it trended towards the north-east, we came on a glacier, with a

steep inclination and frequent crevasses, which compelled us to leave the sledge behind before we attempted to cross it. But the increasing insecurity of our track over fissures, our want of provisions, and the certainty that since noon we had reached 82° 5′ N.L. by a march of five hours, at last brought our advance northward to a close. With a boat we might certainly have gone some miles further.

13. We now stood on a promontory about a thousand feet high, which I named Cape Fligely, as a small mark of respect and gratitude towards a man of great distinction in geographical science. Rudolf's Land still stretched in a north-easterly direction towards a cape—Cape Sherard Osborne—though it was impossible to determine its further course and connection. The view we had from this height was of great importance in relation to the question of an open Polar sea. Open water there was of considerable extent and in very high latitudes; of this there could be no question. But what was its character? From the height on which we stood we could survey its extent. Our expectations had not been sanguine, but moderate though they were, they proved to be exaggerated. No open sea was there, but a "Polynia" surrounded by old ice, within which lay masses of younger ice. This open space of water had arisen from the action of the long prevalent E.N.E. winds. But of more imme-

THE AUSTRIAN FLAG PLANTED AT CAPE PLIGELY

diate interest than the question of an open Polar sea was the aspect of blue mountain-ranges lying in the distant north, indicating masses of land, which Orel had partially seen the day before, and which now lay before us with their outlines more defined. These we called King Oscar Land and Petermann Land; the mountainous extremity on the west of the latter lay beyond the 83rd degree of north latitude. This promontory I have called Cape Vienna, in testimony of the interest which Austria's capital has ever shown in geographical science, and in gratitude for the sympathy with which she followed our wanderings, and finally rewarded our humble merits.

14. Proudly we planted the Austro-Hungarian flag for the first time in the high north, our conscience telling us that we had carried it as far as our resources permitted. It was no act asserting a right of possession in the name of a nation, as when Albuquerque or Van Diemen unfurled the standards of their country on foreign soil, yet we had won this cold, stiff, frozen land with not less difficulty than these discoverers had gained those paradises. It was a sore trial to feel our inability to visit the lands lying before us, but withal we were impressed with the conviction that this day was the most important of our lives, and ever since the memory of it has recurred unbidden to my recollection.

15. The Dolerite of this region was of a very coarse-grained character, and its rocks rose in terraces from out of the white mantle of snow; *Umbilicaria arctica*, *Cetaria nivalis*, and *Rhyzocarpon geographicum* were the sole ornaments of its scanty vegetation. The following document we inclosed in a bottle and deposited in a cleft of rock:—

"Some members of the Austro-Hungarian North Pole Expedition have here reached their highest point in 82·5° N.L, after a march of seventeen days from the ship, lying inclosed in ice in 79° 51′ N.L. They observed open water of no great extent along the coast, bordered by ice, reaching in a north and north-westerly direction to masses of land, whose mean distance from this highest point might be from sixty to seventy miles, but whose connection it was impossible to determine. After their return to the ship, it is the intention of the whole crew to leave this land and return home. The hopeless condition of the ship and the numerous cases of sickness constrain them to this step.

"Cape Fligely, *April* 12*th* 1874.

"(Signed) ANTONIO ZANINOVICH, *Seaman*,
"EDWARD OREL, *Midshipman*,
"JULIUS PAYER, *Commander*."

CHAPTER IX.

THE RETURN TO THE SHIP.

1. This done, our thoughts now turned to the ship, between which and ourselves lay 160 miles. But the *Tegetthoff*, did she lie still where we had left her, or had she drifted away? Fastened together by a rope, we began our return by recrossing the glaciers, and on reaching the stores we had deposited at Cape Germania, the first thing we did was to prepare some water, for the beverage we had taken with us in an india-rubber bottle, made of coffee, rum, and extract of meat, had only aggravated thirst, without adding to our strength. It was late in the evening when we reached our night-encampment near Säulen Cap (Cape Columns), in a state of great exhaustion, cheered and alleviated by the thought of our success. The utter loneliness of our position could not suppress the satisfaction we felt. After digging up our still untouched stores we went to rest for three hours. Longer we dared not sleep; the least breeze might break

up the ice and drive it out of the bight on the north of Cape Auk. The insecurity of our position, therefore, impelled us to make a very early start on the morning of the 13th of April, with the thermometer at −9° R. As we started, we awoke also to the extreme difficulties of the return route, difficulties which the excitement of

MELTING SNOW ON CAPE GERMANIA.

our advance had made light of. Orel, suffering from snow-blindness, marched along with closed eyes, and want of sleep now began to tell on us all. Even our dogs were all worn out, and whenever a halt was made they lay down exhausted in the snow. The sledge had constantly to be unloaded and reloaded, and its fractures

repaired. The surface of the smooth ice, encumbered by the snow slush which had accumulated on it, rendered our progress very burdensome. The dull dreary weather, however, did not prevent the sea-birds from gathering and wheeling around us in enormous flocks. During our noon-day halt, utterly distraught, I cooked our dinner with sea-water; not one of us could touch it. Our road through wastes of snow from Cape Brorock to Cape Schrötter, seemed as if it would never end. However rapidly we advanced, constantly counting our steps as we went along, that Cape remained for hours the same dark spot on the gloomy and snowy horizon. It was evening before we approached it, and as we came within 300 paces of his frontier, we were received and welcomed by ambassadors from Haller. It was curious and also characteristic to observe, how a few days without active employment and without discipline had demoralised our old companions; the party we left behind were scarcely recognisable. Blackened by the oil used in cooking, wasted with diarrhœa, these men crept out of their tent listlessly to greet us on our arrival; a few more days would have sufficed to prostrate them with sickness. Yet they had strictly followed the directions I had given them, and had used with moderation their stock of provisions. As I have already mentioned, I had furnished them, before I started on my expedition northward,

with all the means of ascertaining their position by observations, and of enabling them to begin their return to the ship, in the event of my failing to appear at the end of fifteen days; but when I now asked them what direction they would have taken in order to reach the *Tegetthoff*, to my horror they pointed, not to Austria, but Rawlinson Sound![1]

2. The observations of temperature which Haller furnished me with, scrawled in hieroglyphics on a pease-sausage case, showed a difference of about 2° in favour of the extreme north, and this difference was still more marked, when we came to compare the readings which had been recorded on board ship. The open water to the north was doubtless the cause of this. But the same influence extended southward, and as the snowdrifts over which we walked broke under us with a dull, heavy sound, we began to fear lest the season, when the snow suddenly thaws and the land-ice breaks up, had begun, and that our return would be a matter of extreme difficulty. If there had been nothing else, this would have sufficed to quicken our movements, but to this was added the discovery that our stock of provisions, independent of depôts, would last only ten days more. By ridding

[1] It might have been expected that seamen would have been acquainted with the use of the compass, though the instruments they had at their command were too small to determine the declination with precision.

ourselves of all but absolutely necessary baggage, and leaving behind our common sleeping bag and the tent for the dogs, we lightened our sledge, so as to enable us to extend our day's march considerably.

3. On the 14th of April, the thermometer marking −12° 4′ R., we left Hohenlohe Island in very bad weather, and made for the Coburg Islands, which were scarcely visible. Our route ran between hummocks, which gave the dogs an opportunity they were not slow to use, of taking it easy after their recent exertions. It had been our intention that the large sledge should keep the same line which we had taken in our journey northward, while I with the dog-sledge should visit places to the right and left. This plan, however, was found unfeasible; for in addition to the difficulties and impediments incident to the march, we had an accumulation of evils to contend with. Klotz's foot had become much worse, and all those who had been left behind at Cape Sehrötter were more or less snow-blind, though hitherto our party had suffered little from eye diseases. It was surprising that our dogs did not suffer from this affection, close as they were to the glare of the snow and without any protection against it. Snow-blindness occurs even in Alpine regions. The severity of the attack depends on the character of the snow; the harder and smoother it is, the greater is the reflection and the danger

of inflammation; the retina of the eye is at last injured by the dazzling whiteness of the snow. Various remedies have been employed to mitigate this evil; even the rough-and-ready one of throwing snuff into the eyes has been tried. In Europe snow-blindness is cured in a day or two by wet applications, but in the low temperatures of the high north such a remedy cannot be applied; poultices are hardly possible in the tent, and a simple bandage worn during the march is no preservative against the constant burning sensations common to this affection. It is clear that the range of remedies during a sledge expedition must be very limited. The crew of Sir James Clark Ross suffered in an unusual manner from this cause in their land expeditions. Richardson and Nordenskjöld dropped a weak tincture of opium twice a day into the eye, and in about twenty-four hours the patient recovered, provided he were not compelled to march. Parry on board ship used a solution of sugar of lead and cold water, applied constantly for three or four days—a somewhat questionable remedy, as it is apt to injure the cornea of the eye. Another mode of treatment, which should take effect in six hours, is unhappily not available in a North Pole expedition, as it requires white of egg, sugar, and camphor, beaten up till it becomes frothy, and laid as a compress on the eye.

Some tribes of North America use the steam of hot water, the Creek Indians a decoction from the resinous buds of the Tacamahac—an application which causes much suffering. The only real preservative is the constant use of coloured spectacles, the metal mountings of which should be covered with wool, on account of the cold. The ordinary net-work at the side should be avoided, as this dims the glasses even when the cold is not considerable, whereas open spectacles are only exposed to this inconvenience at very low degrees of temperature, and can easily be cleared by the hand.

4. But to return to our journey. It was evening when the Coburg Islands (81° 35′ N.L.) were reached. The Dolerite rock of this small cluster of islands was of a remarkably coarse-grained crystalline texture. We had frequently come across the traces of bears and foxes during the march of this day, though we actually saw neither bear nor fox. On the 15th of April, after a severe march, we got clear of the region of ice-hummocks, and continued our southerly course with our sledge sail before the wind. We encountered a bear this day, which, being allowed to approach within the distance of thirty paces, fell dead under our fire. In a few minutes we loaded the sledge with fresh meat, and again pursued our journey. But excessive exertion, the want of sleep, and the exclusive use of a meat diet, were meanwhile

telling their tale of reduced strength, though our appetites were great almost beyond belief. The excessive consumption of animal food [1] without bread-stuff excited hunger and lowered our muscular power, while it irritated our nervous system. Our supply of bark was rapidly decreasing, and Haller, Sussich, and Lukinovich, who could not endure bear-flesh, were often attacked with giddiness during the march, and placed on "half-diet."

ENCAMPING ON ONE OF THE COBURG ISLANDS.

In the following week our miseries were intensified by insufficiency of sleep; in fact we could not spare time to sleep it out. Hence the afternoon hours of the march were especially oppressive, and though the sledge with

[1] Franklin, speaking of his experience during his first journey, says that their diet of animal food had rather weakened than strengthened their powers. An Eskimo, on the other hand, often consumes 20 lbs. of the flesh of a seal in a day, and seems to thrive on it—a proof how the mode of living of a savage is no rule for civilised man.

its load was positively lighter, our strength to drag it had diminished in still greater measure. It would be a great mistake to imagine that exercise of itself, without necessary rest, increases the capacity of marching. The loss of strength is almost suddenly experienced, especially in return journeys, when the excitement of discovery has passed away, and nothing is left but the animal-like employment of dragging.

5. Our course lay under Andrée Island; we crossed over the flat ice-dome of Rainer Island, and on the west saw Back's Inlet filled with many icebergs. From this elevation we once more beheld the snowy ranges of Crown-Prince Rudolf's Land in the far distance, which soon, however, disappeared in an ocean of mist, whose white waves rolled over the intervening ice-levels. As we again descended to the icy surface of the sea, to our great astonishment we fell into a hole covered over with snow, and got thoroughly wet, and, after much wandering about, we found, towards evening, a dry place (81° 20′ N.L.) on which to pitch our tent. On the 16th of April we found our latitude by an observation taken at noon to be 81° 12′, and when we reached, in the evening, a point four miles to the north of Cape Hellwald, those whose appetite had failed them could not march a step further.

6. On the 17th of April, Orel, with the large sledge,

continued the march southwards, while I went on with the dog-sledge, in order to ascend Cape Hellwald. The temperature had fallen in the morning to −22° R., and the outlines of the icebergs vibrated and undulated under the influence of refraction. Ice-hummocks, on the distant horizon, insignificant in size, were magnified into gigantic proportions; then again many of these phantasmagoria seemed to form a long line, which broke up at the next step forward. Unyoking the dogs on the shore of the island, I left the sledge behind, and climbed the steep sides of a precipice of clay-slate, with its laminæ firmly frozen into a mass, and reached the summit of the lofty promontory—Cape Hellwald—about 2,200 feet above the level of the sea. On the tops of its basaltic columns great flocks of Divers congregated, which flew round me without fear as I set up my theodolite, and then settled close to me on the snow. I might have killed half-a-dozen of them at a single shot. By and by, these birds, scared by the appearance of the dogs, who soon joined me, took refuge on some inaccessible rocks, but were not in the least disturbed when I fired at them. My lofty point of view enabled me to have a general survey of the mountainous country lying on the north-west, and to ascertain that I stood on an island separated from lands on the west by Sternek Fiord. Meantime

Orel, far below me, was moving on with the sledge, but so great is the advantage of dog-sledging, that I descended and arrived at the same time as he did at Cape Easter. By an observation taken at noon we found our latitude to be 81°. In the afternoon the dogs in their own sledge dragged half of our baggage, and notwithstanding got on more quickly than we did with the large sledge. Henceforward the order of the day was fasting, more or less absolute; for our stock of provisions consisted of bread and bear's flesh for two days and a half, and the dogs could no longer be favoured as they had been.

7. At a few miles' distance there rose before us the rocky cones of Wiener Neustadt Island with large glaciers descending their sides. As it was beyond a doubt that the ascent of one of these conical heights would open up an extensive prospect, I fixed on the imposing Cape Tyrol as the most promising for an ascent. Accordingly, on the 18th of April Haller and I started, and after a toilsome march over glaciers, reached its dark weather-worn summit, 3,000 feet above the level of the sea. Even here we perceived the traces and excrements of the fox, from whose craft the birds were protected by the inaccessibility of the places where they bred. Though we had cut up some bullets into slugs, we refrained from shooting at the Auks and Divers perched

on the rocks, as we saw that our game could not be bagged even if we killed them. Over our heads was spread the bright sky, below us a very sea of mist, in which, though invisible to us, Orel was wending his way towards the south. The distant glacier wastes of Wilczek Land towered aloft on the east; a cloudy shade separated the heights of the Peninsula of La Roncière from the colourless icy wastes of Lindemann Bay, and beyond the

THE VIEW FROM CAPE TYROL. COLLINSON FIORD—WIENER NEUSTADT ISLAND.

picturesque Collinson Fiord, there seemed to be a maze of inlets and bights, bare rocks and broad table-lands. We bitterly deplored that the necessity of returning to the ship prevented us from penetrating into this labyrinth of mountains and sounds.

8. In our descent we passed over three basaltic terraces, and came upon a rocky ledge covered with a thick

carpet of *Usnea melaxantha*—a fresh example of the great capability of lichens to bear extremes of temperature, the great cold of winter and the burning heat of the rock in summer. The mists now began to rise, and for the first time a greenish landscape without snow gleamed out of the depth, on which lay the warm glow of the sun. The scenery seemed to belong to the Alps, and not the eighty-first degree of North Latitude. The contrast became the more striking, when the mists rolled away and unveiled the Icebergs and the ice-filled Sound. When we reached these green mountain slopes we found ourselves among grasses, the lower stalks of which were already beginning to be green; the few flowering plants (*Saxifraga oppositifolia, Silene acaulis, Papaver nudicale*) were clustered together in dense masses. We were now able to form some conception of what summer might be here. Countless streams issuing from the snow would force these spots to put on the livery of summer, and rapid torrents would precipitate themselves down gorges of snow and rock; but at present all was stiff and stark, save that stunted green herbage seemed to show that we were in the fancied paradise of Franz-Josef Land, though when compared even with other Arctic lands it was but a scene of desolation. Closer to the shore above the level of the sea, in a belt of yellow sandstone, we found

much Lignite firmly frozen in the ground, resembling drift-wood a century old.

9. The search for our companions was for some time fruitless; and a driving snow might have separated us from them for ever. At last, however, we found them gathered together in the tent near Forbes' Glacier, in about 80° 58′ N. L., and as the party had been without tobacco for a fortnight, they greeted Haller's collection of Lichens as a welcome substitute.

10. During the last few days the cold had sensibly increased, dan we therefore determined to sleep during the day, and to walk during the night. Our march in the night of April 18 was a memorable one to us. We were trudging along in the face of a strong south-wester —which was extremely distressing to our highly sensitive frozen noses—and striving to protect the soles of our feet by the rapidity of our movement from being frost-bitten. After succeeding to a certain extent in this, we began to find the snow very deep, and so soft that we sank in at every step. This grew worse and worse; water rose in the deeper layers of snow and penetrated our boots, and as this could not be explained by the state of the temperature, we had to step with distrust and hesitation, in constant fear of unseen depths. At first we believed that the water arose from streams flowing from underneath the glaciers, or from the movement

of these glaciers breaking up the surface of the ice. Hence we kept at a distance from their terminal walls. But that the ice-sheet of the sea itself had broken up, that unseen fissures surrounded us, and that the water under the snow was nothing but the water of the sea forcing its way in, of this we had not the

BREAKING IN.

least conception, till the sudden immersion of the leader of the party left no doubt about the matter. Once Haller would have utterly disappeared unless he had been quickly rescued. As we picked our way along, even with a long pole we found every now and then no bottom. Klotz now took the lead with a long "alpenstock," guiding us with the greatest dexterity among these

fissures, though often himself falling in. Greatly did we rejoice when we reached unbroken footing. Some of the party on this occasion were frost-bitten in the feet, but we could do little more for them than rub their feet with snow, and improve as we could their foot-covering. The sun was now visible at midnight, and the mountains of Markham Sound were tinged with rosy light.

11. Ahead of us in the south lay a dark water-sky, while the land on either side was veiled in mist and fog. We tried to persuade ourselves that this phenomenon might be explained otherwise than by open water. Soon, however, we heard the unambiguous sound of ice-pressure and of the beating of the surf at no great distance, and when we went to rest, in 80° 36′ N. L., it was with the feeling that we needed new strength to meet the dangers which unquestionably awaited us. We slept soundly for some hours in spite of all our anxious fears, till we were aroused by the increasing noise. We now advanced along the old sledge-track upon which we had fallen. Orel and I went first, and after we had gone a few hundred paces the truth burst upon us: we saw the sea ahead of us and no white edge beyond. Walls of forced-up ice surrounded this water, which, stirred by a heavy wind, threw up crested waves; the spray of its surf dashed itself for a distance of thirty yards over the icy shore. Forthwith ascending an iceberg, we

ARRIVAL BEFORE THE OPEN SEA.

looked over the dark waste of water, in which the icebergs, under which we had passed a month before, were now floating; the more distant of them stood out against the arch of light on the horizon, and those nearer to us shone with a dazzling brilliancy under the dark water-sky. That on which lay our depôt of provisions was floating in the midst of them; and here we were, without a boat, almost without provisions, and fifty-five miles distant from the ship! A strong current was running southwards at the rate of three or four miles an hour; fragments of ice were driving before the wind, as if they meant to delight us by their movements, and as if there were no change for the worse to a handful of men, who stood in reality before an impassable abyss.

12. But what were we to do; what direction were we to follow? If we killed and ate our dogs and broke up our sledge to find wood to melt the snow, we might live for eight days longer. In this case we must ourselves carry our baggage. But the most important question was, Whither? In what direction did the ice lie still unbroken? Did the land on the West afford a connected route to the ship? Did the sea before us communicate further south with the sea where the *Tegetthoff* lay? There was but one alternative—escape by land and over land; and because open water could be traced to the north-west beyond the bare reefs of the Hayes Islands,

and heavy clouds over Markham Sound seemed to indicate that the ice had broken up in it also, I decided to try the way over the glaciers of Wilczek Land. Everything depended on the unbroken state of the ice in the southern parts of Austria Sound. Dejected as I was, I finished my sketch of this dreadful scene, while Orel

DRAGGING THE SLEDGE UNDER THE GLACIERS OF WILCZEK LAND.

went back to caution the men against venturing on the young ice and to tell them to keep to the old ice under the land. While the men were struggling with the great sledge in the snow, I descended from my higher point of view, and, soaked through by the surf, went along the ice-strand in a south-easterly direction towards Wilczek Land. The others followed, and though we

came on many fissures merely covered with snow, we yet reached *terra firma* in safety, Orel skilfully guiding the movements of the sledge according to the signs agreed on.

13. But soon afterwards everything was veiled in mist; the temperature rose to − 11° R., then came driving snow, which gradually increased to a snow-storm, and in order not to be cut off we were obliged once more to keep together. Dreadful as the weather was, we could not venture to put up the tent; march we must, in order to escape before the wind destroyed the ice-bridges on the way back. We trudged along under enormous glacier walls, enveloped in whirling snow. Sounding all round, we escaped the abysses with difficulty. We could scarcely even breathe and make head against the wind. Our clothes were covered with snow, our faces were crusted with ice, eyes and mouth were firmly closed, and the dark sea beneath us was hidden from our view. We ceased to hear even its roar, the might of the storm drowning everything else. Haller, a few paces ahead, continually sounded, so as to keep us clear of fissures. We could scarcely follow him or recognize his form. We saw nothing even of the enormous glacier walls under which we toiled along, except that at times we caught a glimpse of them towering aloft. At every hundred paces we halted for a few minutes to remove the ice which formed itself on our eyes and round our

mouths. We stilled our hunger with the hope, that we should find and dig out the body of the bear, which we had shot a month ago. But we dared not rest, nor await the abatement of the storm, until we had crossed the glacier and felt the firm ground, free from ice, beneath our feet. This we compassed after a march of seven hours. Utterly exhausted, we then put up the tent on a stony slope, got beneath it, white with snow, wet through and stiffened with ice; notwithstanding our hunger, we lay down to sleep without eating. Not a morsel of bread could we venture to serve out from the small stock of provisions that remained. Our prospects were gloomy in the extreme. If open water, or even a broad fissure at Cape Frankfort, separated us from the ship, we must inevitably perish on the shores of Wilczek Land.

14. The snow-storm still continued to rage; hunger, cold, and moisture forbade sleep, and the dogs, covered with snow, lay in front of the tent. On the 20th of April (the thermometer marking $-13{\cdot}3°$ R.), after a breakfast more suited for a patient under typhus fever than for men hungry as wolves, we left the tent in our still wet clothes, and while standing on its sheltered side to wait till it was cleared, our clothes froze into coats of mail. As we went on, the terrible weather blew out of us almost all that remained of our courage and resolution. It was evening before the storm abated, but we

THE SLEDGE IN A SNOW-STORM.

had the good fortune to find the iceberg with our last depôt in its former position close to the shore. There were the 45 lbs. of boiled beef, and there, too, the bear lying two feet deep in snow. It took us an hour to dig him out and load our sledge with this frozen mass, which we were glad to call provision. After each of us had

DIGGING OUT THE DEPÔT.

devoured 3 lbs. of boiled beef and bear's flesh, on we went. To our inexpressible joy the open water had retreated to the west, and we were able to get round it by making a considerable bend. The numerous fissures which crossed our path we succeeded in evading, and by ascending icebergs were able to pick our way, till at last we arrived safely at Cape Frankfort (80° 20′ N.L.).

At its base we found, to our great satisfaction, the land ice running without break towards the ship. This amounted, in fact, to deliverance, and we celebrated our joy at the event by a glass of grog. The next thing to be done was to search for the depôt of provisions on Schönau Island.

15. On the 21st of April (the thermometer marking – 17° 5′ R.) Orel led with the large sledge, while I remained behind with the dog sledge, in order, from an elevation at Cape Frankfort, to complete the measurement of certain angles indispensable for the maps I was constructing. We joined company again nearly opposite Cape Berghaus, and together crossed a broad reach covered with ice-hummocks. The weather was clear, and brilliantly-marked parhelia hung over the dark blue background of the mountains. We again came on very deep snow, and as we advanced with much difficulty and great exertion, we got rid of the bear, after we had cut off from it every portion that could be used for food. The relief, however, was not great, and we were repeatedly compelled to halt and rest. Lukinovich and the much-enduring Zaninovich were taken with fainting fits, the consequence of their excessive exertions. Indeed we were all more or less faint and emaciated. During one of these halts in order to quicken their failing energies, I held forth to them on the

astonishing example of MacClintock's sledge journeys. The Dalmatians freely expressed their admiration of those Englishmen, but the Tyrolese were rather slow to believe.

16. Soon after midnight on the 22nd of April (the thermometer standing at −17° R.) we reached Schönau

THE MIDNIGHT SUN BETWEEN CAPE BERGHAUS AND KOLDEWEY ISLAND.

Island, round which the ice had broken up, so that we frequently fell into the fissures. As we erected our tent, the sun was setting behind the violet-coloured edges of the ice-hummocks, while the lofty pinnacle of Cape Berghaus stood out sharply marked against the sky. The situation of the island we had reached

being extremely favourable, on the highest point of it, I took some observations, which completed the surveys which I had made during this expedition. Close to the eastward of us, the ice had broken up round Hochstetter Island. Orel had meanwhile put up the tent, and Klotz had dug out the depôt of provisions, which, to our great joy, we found had not been disturbed by bears. The danger of starvation was at an end, and after satisfying the claims of hunger we enjoyed a delicious sleep of seven hours, and again set forth. We were still twenty-five miles from the ship. This distance I now determined to compass with the dog-sledge with all the speed possible, in order to ascertain whether the *Tegetthoff* remained where we left her. Orel was to follow close with the large sledge. The day was of unusual brightness. All the land, which a month ago had been the home of storms and enveloped in snow, now shone in the sunlight, and the walls of rock wore their natural brown colour. My route lay close under Koldewey and Salm Islands. At first every fragment which had fallen from a glacier on either of these islands was used as a pretext by the dogs for turning out of the course, and the trail of a bear seemed quite to distract them. It was to little purpose that I went on first to show them the way. No sooner was the least liberty allowed them, than they used it to make

now for Cape Tegetthoff, then for Cape Berghaus, and, in preference to every other point, for the sun! Ever and anon Torossy dragged Jubinal out of the road, and this unruliness lasted till we came on the old sledge track, which was almost obliterated by the snow. Suddenly they seemed to feel as if they had entered on a familiar region. With their heads raised, and tails in the air, they now rushed along at the rate of 180 paces in a minute, though I had now taken my place on the sledge. The south-west corner of Salm Island was beset by a crowd of apparently stranded icebergs. Under the sheltered side of one of these colossal masses I made a short halt, and lighted the cooking-machine to thaw some boiled beef, and enjoy a meal in common with my canine companions, who regarded all my movements with fixed attention. Just as I was intently observing a small dark point on the horizon advancing in my direction—it was Orel and his party—the iceberg, in whose stability I was placing complete confidence, suddenly capsized, and, rolling on to the ice, shivered into fragments. In an instant I was surrounded by fissures, pools of water, and rolling pieces of ice. Seizing the cooking-machine, which I had lighted, I escaped with great difficulty. I had often observed, that icebergs were surrounded by circles of shattered surface-ice, with sea-water standing in their fissures. The overturning of icebergs, which occurs,

I apprehend, more frequently than is generally imagined, easily accounts for the fact. It is therefore advisable to shun the immediate neighbourhood of an iceberg when the tent has to be erected, and to avoid using the iceberg itself as a place for a depôt of provisions.

17. When I turned into the narrow passage between Salm and Wilczek Islands, Orgel Cape, visible at a great distance, was the only dark spot in the scene. At once the dogs made for it, and about midnight I arrived there. A few hundred steps further, and I should stand on the top of it, and see the ship, if ship were there. With an anxious, heavy heart, I then began the ascent. A stony plateau stretched before me. With every advancing step, made with increasing difficulty, the land gradually disappeared, and the horizon of the frozen sea expanded before me—an immeasurable white waste. No ship was to be seen—no trace of man for thousands of miles, save a cairn, with the fragments of a flag fluttering in the breeze, and a grave covered with snow-drifts. Still I climbed on. Suddenly three slender masts emerged—I had found the ship: there she lay about three miles off, appearing on the frozen ocean no bigger than a fly. The snow-drifts and icebergs around her had hitherto concealed her from my eye. I directed my telescope towards her, and every spar and sail I saw seemed to promise a happy conclusion to our expedition.

I held the heads of the dogs towards the ship, and pointed with my arm to where she lay, that they might share in my joy. We soon descended, and took our way towards her. At about a hundred yards off the watch detected us. All on board but the men who composed it were asleep, for it was night. At first

THE "TEGETTHOFF" DESCRIED.

they were exceedingly alarmed to see me alone, but having calmed their apprehensions, I went down at once into the cabin to awaken the sleepers. Great was the joy caused by the account of the high latitude we had reached, and of the discoveries we had made, which I endeavoured to explain by the rough outline of a map which I sketched. In a few hours the stock of questions

was answered and exhausted, and everyone now left the ship to welcome the approaching party, which was soon descried with the sledge-flag flying. Hearty and joyful were the mutual greetings, and the appetite of the emaciated adventurers occupied this night and for a week afterwards, all the attention of the rest of the crew.[1] We formed a strange group to look upon, but Klotz carried off the palm from us all.

KLOTZ.

He had never shown any weakness in counteracting the effects of weather and exposure on his motley garments. His cap, a wondrous piece of patchwork, resembled the winged helmet of a knight-errant, and of his boots nothing remained but the feet, over

[1] Our food, which we always took as hot as possible, had made our tongues and gums as hard as leather, so that we could not discriminate what we ate. Our great desire was not for flesh, but for white bread, potatoes, and milk.

which hung the legs of them in shreds and tatters. Carlsen, when he saw him stepping along proudly and silently, forgot for a moment his walruses, and compared him to Saint Olaf, who could find only one horse in "Gulbrandsdalen" strong enough to carry him.

18. During our absence the greatest activity had reigned on board ship. Weyprecht and Brosch had finished their magnetical observations, and measured on the ice the base, which I have already mentioned, for the trigonometrical portion of my surveys. The crew had begun the equipment of the boats for our return to Europe, and packed up the provisions in water-tight cases. The number of the sick had diminished; the frost-bites had yielded to a persevering course of poultices and baths. The only unpropitious circumstance was the accident which had befallen Stiglich, who had shattered his right arm by accidentally discharging a rifle. Sores and wounds in Arctic regions are difficult to heal, and especially during the winter. Thanks to the care of our physician, Stiglich's severe wound healed more quickly than many a slighter injury during the cold period of the year. The sanitary condition had essentially improved, owing to the rich supplies of fresh meat afforded by the chase. Even before our arrival the ship's company had killed several bears. Scarcely a day

now passed without a bear coming near the ship. On the 25th of April we shot one in the act of tearing down with his fore-paws a cask sticking in the ice, and on the following day another fell a victim to the curious attention with which he was regarding some meat packed in a tin case. Birds also, especially Divers, appeared in greater numbers; the cliffs of Wilczek Island were no longer desolate as before. Hence it was that we indulged in dishes of stewed birds and roasted bears'-flesh. We had brought with us seven bears' tongues; each day brought an accession, and our culinary art exercised itself on the refined preparation of bears' tongues, which, together with the brains of this animal, were esteemed the greatest delicacies. Weyprecht, according to agreement, had caused a boat and provisions for three months to be put on shore, intended for the use of the sledge-party in the event of the ship being driven from her moorings. As these precautionary measures could now be dispensed with, the boat and all these provisions were removed to the ship. Later experience proved that the exploring party could not have escaped in this manner, for the united strength of three and twenty men was required to raise and place such a boat on a sledge.

CHAPTER X.

THE THIRD SLEDGE JOURNEY.

1. THE weather during the last days of April was truly delightful; calms and bright sunshine made work and exercise in the open air exceedingly pleasant, and the temperature never fell below $-15°$ R. But even this amount of cold was sufficient to retard the softening of the snow for some days, and favoured the carrying out of a third sledge expedition. Its intention was the exploration of the western portions of Franz-Josef Land; for the question of its extension towards Spitzbergen was scarcely less interesting than its extension towards the North. I should have liked to devote weeks to the undertaking, but our impending return left a few days only at my disposal.

2. On the 29th of April (the thermometer marking $-15°$ R.), Lieutenant Brosch, Haller, and myself, left the ship. Jubinal and Torossy were selected to drag the small sledge, which was equipped for a week's

expedition; Pekel accompanied us as a volunteer. The measurement of the angles necessary to complete my survey detained us so long on the heights of Wilczek Island, that we could not make our start on the level ice, till the next morning. The power of the sun some days was so great, that the temperature of the tent at noon, when there was no wind, rose to +14° R., while in the two preceding months it was from 10° to 20° below zero. If the temperature during the day did not fall more than 6° below that point, we required no clothes beyond our woollen underclothing and stockings. As we started in the morning of April 30, some snow fell, and the mountains were covered with masses of mist, which lay in horizontal layers half way up their sides. Cape Brünn, however, which was our goal, lay before us, clear and distinct, and the long glacier walls, running to the west of it round the edge of MacClintock Island, were under the constant play of refraction and could be traced as far as Cape Oppolzer, from which point they seemed to trend to the north-west.

3. The snow-track of the Sound was still firm, so that our dogs needed little help in dragging our baggage, especially after we had buried provision for the return journey in an iceberg. We had scarcely finished this labour when we discovered a bear's hole in the layer of snow at its base, and immediately afterwards we beheld

its occupant coming furiously towards us. Several hasty shots were fired at him, but the bear escaped, though evidently wounded. The nearer we approached MacClintock Island, the more frequently we found fissures in the ice running parallel to the coast and communicating with a small "ice-hole" in the south about four miles off. Trusting, however, that during the next few days these fissures would not open so much as to prevent our re-crossing them, we went on and pitched our encampment near the terminal front of one of the glaciers of the island.

4. Our dogs continued now, as before, the implacable enemies of bears. Matotschkin's sad end had not frightened them into prudence and caution, doubtless because they counted on our prowess against the common foe. To them nothing could be a more joyous spectacle than a wounded bear. If in his flight he became faint and exhausted they surrounded him, bit at his legs, and did all they could to prevent his getting away, and courage, as well as love of mischief, was visible in all their actions. Pekel, small as he was, was the leader in all attacks, and Torossy grew under his tuition to be at length a formidable assailant. So things proved now. While we were busily preparing our supper in the tent a young bear appeared on the scene; before we could stop them, out rushed the dogs on our visitor, who

at first retreated, while the dogs followed hard on his heels. As it generally happened that the bear, after a time, turned on his pursuers and gave them chase, we were somewhat alarmed for the safety of the dogs, especially of Torossy, who sometimes was so stupid as not to find his way back to the tent without guidance. Just as we expected, the bear turned and became the pursuer; Torossy taking the lead in the retreat. Our small stock of cartridges and superfluity of bears' flesh, might have induced us to gaze at him while he gazed on us, if he had only kept at a respectful distance; but he would come too near, and reluctantly we found ourselves under the necessity of killing him and depriving him of the dainty morsel of his tongue. Forster says that the flesh of the polar bear tastes like bad beef, an opinion which we are able to endorse and confirm, as we had consumed in this expedition about four bears apiece.

5. On the 1st of May (the thermometer standing at $-12{\cdot}4°$ R.) we purposed to cross the Simony glacier and ascend the pyramid-like Cape Brünn, whence we might hope to see at a glance as much of the surrounding country as would have required a journey of several days on the level to discover. Unfavourable weather, however, prevented the execution of this project, and we were obliged to keep in our tent. Lieutenant Brosch,

whose duties in taking magnetical observations stood in the way of his accompanying me in the previous expeditions, had now the misfortune to injure his foot; and in consequence of this accident I had to start next morning (May 2) accompanied only by Haller, to attempt the ascent. Fastened together with a rope, we passed over the Simony glacier amid heavy

MARKHAM SOUND, RICHTHOFEN PEAK FROM CAPE BRUNN.

snow-storms from the W.N.W., and in a zigzag course went up the steep pyramid of Cape Brünn. Never have I made a more disagreeable ascent. A steep snowy gorge led through a crown of rocks to the summit, which we reached after a march of five hours. By an aneroid observation we found the height to be 2,500 feet.

6. If the ascent of a mountain in the face of wind and

penetrating cold demands all the self-command even of men the most inured to fatigues, it required the additional stimulus afforded by the view of an unknown land, to give us endurance and energy under such circumstances, to sketch, to take azimuth measurements, and estimate the distances of important localities. To add to our difficulties, the theodolite was constantly shaken by the wind, so that every angle had to be observed repeatedly, in order that an available mean value might be obtained. It was only after several hours of the most severe labour that my work was completed. My attention was directed chiefly to the southern parts of Zichy Land, which formed a vast mountainous region beyond Markham Sound. Half the horizon was bounded by cliffs and heights gleaming with snow. The conical shape of the mountains prevailed here also; the only exception was Richthofen Spitze, the loftiest summit, perhaps, we had seen in Franz-Josef Land, which rose like a slender white pyramid to the height of about 5,000 feet. The land was everywhere intersected by fiords and covered with glaciers. Its boundaries towards Spitzbergen, or Gillis' Land, could not be determined, because even at the distance of fifteen or twenty German miles, mountain ranges were distinctly to be traced. It would appear, therefore, that masses of land

stretch in this direction to at least the fiftieth degree, perhaps even to the forty-eighth degree, of east longitude. We also discovered, that the lands on the south of Markham Sound were separated by a fiord—Negri Sound. This was already open, and since some darker spots indicated fissures in the ice in Markham Sound, it is probable that sledge journeys can be only undertaken early in the spring in Franz-Josef Land without the danger of being cut off. At the time when we made our observations, it was utterly impossible that such waters could be navigated by any ship, not even if she could be placed amid these small unconnected "ice-holes." Haller, whose rheumatic tendencies unfitted him to bear wind and cold, had, meanwhile, posted himself in a cleft of rock sheltered from the wind beneath the summit, but I was quite satisfied with his running to my help, in order to rub my frozen hands with snow, when I was forced to drop the book in which I recorded my labours.

7. But however great our delight at the discovery of these unknown lands—trophies of our endurance—we were much discouraged by the view towards the south. An enormous surface of ice extended before us—a sad outlook, as we thought of our return homeward. Although one single serpentine thread of water, gleaming in the sun, stretched towards the south-east, separating

the land-ice from the field-ice, yet it was but too certain that the next breeze from the south would again close it. All save this was a close sheet of ice. We spent some time in exploring the lower glacier region of the island, so that it was towards evening before we reached the tent. Much as we desired to prosecute our explorations, reflection forced us to limit them. In order to penetrate in a north-westerly direction several days would have been needed; but as it had been arranged that we must at once begin our return to Europe, we were constrained to abandon the thought of such a scheme and return at once to the ship. On the night of the 2nd of May we began our forced march of two-and-twenty hours, during which we were often bathed in perspiration, though the temperature on the 3rd of May varied between $-12°$ and $-16°$ R. The dogs alone drew the sledge with ease, though it carried a load of 3 cwt., giving us such a striking example of what they could do, that we felt persuaded that a sledge, with a strong team of dogs, must be the best form, beyond comparison, of sledge-travelling. In the evening we reached the *Tegetthoff*, and our sledge expeditions came to a close, after we had travelled in this fashion about 450 miles.

THE "TEGETTHOFF" ABANDONED: RETURN TO EUROPE.

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC

CHAPTER I.

LAST DAYS ON THE "TEGETTHOFF."

1. We could now return with honour. The observations and discoveries we had made could not be wrested from us, and our many anxieties on this ground were at an end, henceforth the greatest evil that could befall us was death on our homeward voyage. The intervening days were given up to the recruiting of our exhausted powers; Klotz called this time the "plundering of the ship." Not very much time, indeed, was left for this, but the short spell of good living, in which we all shared, transformed the ship into an abode of Epicureans. But withal we redoubled our diligence to secure the results of our toils and labours. Lieutenant Weyprecht deposited our meteorological and magnetical readings, the log-books and the ship's papers, in a chest lined with tin, and soldered it down, and a few days afterwards I made exact duplicates of the surveys, and of measurements,

which I had taken. I took especial care so to prepare these, that another person might be able to construct from them a map of Franz-Josef Land, should I myself perish on the return journey. These sheets also were packed in a chest lined with tin and soldered, and along with them were placed our zoological drawings and about 200 sketches of the country, of the Arctic Sea and our adventures, the flag too of the sledge journeys, and my journals. Of the zoological collection itself, only a small selection of the specimens, most easy of transport, could be taken with us.

2. The time passed away with unexpected rapidity; the days had scarcely begun before they seemed to have come to an end. Everyone was busy in getting his clothes ready. In the quarters of the crew, sewing went on without intermission, and piles of thread disappeared under their fingers, to appear again in the strangest patterns worked on the old garments. Avalanches of cast-off clothes hung over the hull of the ship. The vessel—no longer trim as before—came to wear the look befitting the catastrophe that awaited her. A great number of bears' carcases lay on the ice,[1] for only the

[1] On May 5 a bear got away from us through a bad shot, but a second was killed just as he had attacked Torossy. May 9, again a bad shot scared away a bear; on the 11th one was killed by Herr Orel. This bear had already received a ball in his shoulder, and a second in his head an inch and a half under the right eye.

brain, the tongue, and the prime portions of the flesh found their way to the kitchen, the remaining parts lay about half buried under snow-drifts, given up to the dogs to tear to pieces, who now for the first time found themselves exempted from rations served out according to time and circumstances. A month later, and such a field of carnage would have become a very home of pestilence.

3. Short excursions with the dog-sledge enabled us to finish our observations on the motion of glaciers, which the great depth of the snow had hitherto made a matter of much difficulty. The last of these expeditions took place on May 15th. On the spot on which we had first set our foot, we took farewell of the grave of our departed comrade and of the Land to which we had drifted through the happy caprice of an ice-floe and the discovery of which rendered a return without humiliation possible. But with this farewell the business of the expedition came to an end, all our thoughts were now occupied with getting back to Europe. Of the issue we dared not form the least conception; but whether it were deliverance or destruction, our lot must at any rate be decided within three months, as for this period only we could drag with us the most indispensable provisions.

4. On our equipment Lieutenant Weyprecht and I

bestowed much thought and care, and our measures were carried out with the greatest exactness. All these were based on the excellent apparatus for sledging already described; the additional precautions were confined to the more convenient stowing away of the provisions, and to the diminishing, as much as possible, of the baggage. The rapid decrease of the cold and the consequent rise of the temperature, even above the freezing point, enabled us to reduce our clothing to a minimum without endangering our health; and no more comfortable sleeping-place for Arctic explorers can be conceived than the interior of a dry boat, covered in like a tent and provided with bed-quilts. There was more danger that we should suffer from heat than from cold; the apprehension of insufficient provisions was better founded.

5. Three boats were selected for the return expedition. Two of these were Norwegian whale-boats, 20 feet long, 5 feet broad, and $2\frac{1}{2}$ feet deep. Lieutenant Weyprecht, Dr. Kepes, Lusina, Orasch, Latkovich, Palmich, Vecerina and Klotz, formed the complement of the one; and Zaninovich, Haller, Lukinovich, Scarpa, Stiglich, Pospischill, Midshipman Orel and I, the complement of the other. The third and somewhat smaller boat carried Lieutenant Brosch, Captain Carlsen, Cattarinich, Lettis, Sussich, Marola and Fallesich. Each

of these boats rested on a sledge, and was laden with the following articles :—

10 light oars.
2 long steering oars.
1 sail and mast.
1 ice-anchor.
2 boat hooks.
1 harpoon and line.
1 fishing line.
1 small hatchet.
1 ice-borer.
1 screw-driver.
1 caulking iron.
1 saw.
6 reserve sledge screws.
1 bag of nails.
2 Lefaucheur rifles.
1 Werndl rifle.
1 case with 100 shot cartridges.
1 case with 50 ditto.
2 cases of 50 Lefaucheur cartridges.
25 Werndl cartridges.
8 sledge traces.
6 lamps.
6 weights for measuring provisions.
2 pairs of reindeer shoes.
2 oil cans.
1 bag of nails.
20 boxes of lucifer matches.
1 steel and tinder.
1 compass.
1 sextant.
1 bundle of wicks.
1 telescope.
1 signal horn.
1 50-fathom line.
1 box of lard.
1 pair of tin-cutters.
1 grindstone.
3 bungs.

Spare Clothes.

1 pair of drawers.
1 shirt.
1 woollen undershirt.
1 pair of trousers.

1 spirit measure.
1 pair of scales.
1 spirit can.
1 lever.
1 funnel.

To each boat was attached a large sledge thus laden :—

	lbs.	lbs.
Pemmican—4 boxes of 50 lbs.	200	
„ 1 box of 25 lbs.	25	
„ 4 boxes of 5 lbs.	20	
		245
Peasmeal—2 chests of 100 lbs. packed in tin	200	
„ 1 chest of 100 lbs. packed in paper	100	
		300
Potted Meat—1 chest of 80 lbs.		80
Boiled Beef—5 chests of 10 tins of 7½ lbs.	375	
„ „ 4 „ 7½ lbs.	30	
		405
Flour—3 boxes of 33 lbs.		99
Bread—2 bags of 83 lbs.		166
Chocolate—3 boxes of 30 lbs.		90
Spirits—3 casks, each weighing 77 lbs.		231
Salt—1 box of 12 lbs.		12
Extract of Meat—2 boxes of 5 lbs.		10
Tea—1 box of 3 lbs.		3
Total		1641

To this must be added 100 lbs. of bread for the dogs, and a shovel and a complete cooking apparatus for each sledge. Our load therefore amounted in provisions alone to about 50 cwt., and including everything, to about 90 cwt. Parry, with twenty-eight men, in 1827 had for his journey of sixty-one days two boats and four sledges, carrying a total weight of 75 cwt.—about 2½ cwt. therefore for each

man. Notwithstanding great obstacles from the ice, his expedition was, perhaps, more favoured than ours, for he passed over 1½ degrees of latitude in thirty days.

6. Of our dogs, two only, Jubinal and Torossy, were available to drag the small sledge; 1 cwt. of bread was all we could take for them, and for the rest they had to depend on the product of the chase. Gillis was shot on account of his intractability, and Semlja because of her weakness. Only Pekel was allowed to accompany us; he only of the dogs had the right of going about at liberty; yet his life too was safe only as long as our provisions lasted.

7. Our stock of clothes consisted of two woollen shirts, one pair of woollen drawers, three pairs of stockings, leather water-boots, a cap, and of a fur-coat to sleep in. Clean woollen undergarments were much in request, and many a manœuvre was practised to get possession of them. Each of the party carried besides a large knife, a spoon, and a pair of snow-spectacles. Of luxuries none were permitted to us but a tobacco pouch to each man; but filled with such art that it was like a stone in weight. We were not allowed to line our coats with tobacco.

8. Our plan was simple—to reach the depôt of provisions on the Barentz Islands, which lay in an almost directly

southerly direction. After replenishing our stores there, we proposed to follow the coast of Novaya Zemlya with the hope of reaching one of those ships which the salmon fishery in the rivers of that country detains there to the beginning of harvest. It was also not impossible that we might be discovered before this, on the more northern coast of Novaya Zemlya, by a Norwegian seal-hunter. The boats were to keep together if possible; but in case they should be separated, the Wilhelm Islands were fixed on as the place of rendezvous up to the middle of August. At first night was chosen for the march, and day was devoted to sleep; the observance, however, of this regulation was constantly prevented by special circumstances. The success of the expedition depended on our crossing the ice-covered sea by the end of August. The greatest difficulties were to be apprehended from the melting of the snow, for although the thermometer at the beginning of May fell 14° and even 17° below zero, and sharp north-east winds somewhat retarded the thaw, the mean temperature during the day approximated to zero, and on May 16 it actually rose above it. Two of our men, Stiglich and Vecerina, were unfit for duty, and had often to be dragged in the sledge. The rest of the men were healthy, and the swelling of the feet, from which the sledge party had suffered, had disappeared.

CHAPTER II.

ON THE FROZEN SEA.

1. THE momentous day came at last—the 20th of May, the very day in 1855 on which Kane abandoned his ship ;[1] and we hailed with joy the advent of the hour which was to terminate our life of inaction. Yet we could not see without emotion the flags nailed to the masts of the *Tegetthoff*, and the final preparations to leave the ship, which had been our home for two weary years, and in which we had confronted the perils of the Frozen Sea, its ice-pressures, its storms, and its cold. These recollections crowded upon us as the moment came to abandon her. Now too we had to part with our Zoological, Botanical, and Geological collections, the result of so much labour ; the ample collection of

[1] With three boats, two of which were whaleboats each 26 feet long and 7 feet broad. His crew wore Eskimo clothing, and, strange to say, some of them had gutta-percha masks. Parry's towards the North Pole in 1827, Kane's in 1855, and our own have much in common ; but the greatest difficulties were on our side.

instruments, the books which had helped us over many a weary hour, and the sixty-seven bear-skins which we had so carefully prepared, all these had also to be abandoned. The photographs of friends and acquaintances we hung on the rocky walls ashore, preferring to leave them there rather than in the ship, which must some time or other be driven ashore and go to pieces. A document stating the grounds of our decision was laid on the table of the messroom.

2. We slept during this day, and in the evening sat down to the last meal we were to enjoy on board the ship. About nine o'clock P.M., we assembled round the boats, ready for the start. Dark masses of clouds obscured the sun, and our route southwards led us into the gloomy monotonous region of ice-hummocks covered with snow—our world for the next three months. The first day's work for twenty-three men, harnessed to boat or sledge, was the advance of one mile ; and even this rate of progress, small as it was, was not constant. Many days it did not amount to half a mile ; the sledge sail was of little avail, for the deep snow retarded our progress ; the sledges sank deep into it, those on which the boats were placed actually sticking fast. We had to pass three times heavily laden, and twice empty over every bit of the road, and

half our number were scarcely able to move a sledge or a boat. Such labours and exertions in deep snow were truly distracting. Almost at every step we sank knee-deep. Sometimes some unhappy fellows went in deeper still; of Scarpa, it was asserted that scarcely anything but his head was visible while he dragged. Constantly we had either to unload the sledge, or harnessing ourselves all together for a moment, drag it out of the deep snow-drift. For one half of the march we might get on without special impediment, the other half was spent in vain efforts to push the load on, amid "Aussingen,"[1] to time the strong pull and the pull all together. The perspiration often streamed down our faces, for the sky was overcast, and the air exceedingly sultry. After the exertion of some days, raw wounds appeared on the shoulders of several. After a bit of our track had been passed over three times in the way described, it was like a path in the snow hollowed out by the shovel, so that we had spent our strength in levelling it, but hardly in satisfactory progress. To add to our trials, we suffered intensely from thirst, and those among us who were unaccustomed to the fatigues of sledge-travelling, sank down in the snow at every halt and greedily ate of it. If such were to be

[1] "Aussingen" is a sailor's word for a particular rhythm to which they pull in time.

the course of our journey, would escape be possible? Not a man among us imagined that we could be saved, except by some extraordinary and happy turn of fortune, small signs of which were at present to be seen. To escape from this depressing fear, we deliberately avoided every allusion to the future.

3. The dogs, under the superintendence of Carlsen, took their part in the transport of the baggage, but showed themselves very lazy and intractable under his management, and seemed to take a pleasure in plunging their loaded sledge deep into the snow, out of which it was beyond the old man's power to free them without help. Nor was their own strength equal to going over the track twice at least, even with only one cwt. each time. If, therefore, their services were to be turned to account, they must be led by some one whom they obeyed, who could help them by shoving or dragging, who could set up the sledge when it overturned, and was strong enough to keep constantly lifting the heavy bags, and who could pass over the same piece of road four or five times, if necessary. This duty was taken in turn by Haller and myself, and we succeeded in transporting in this way daily all the bread and the spirits, weighing together from 8 to 10 cwt., and, in some cases, at a later period, even the entire load of a great sledge divided into parts. I mention this in order to

show the great services which our dogs, though their number was small, rendered during the march.

4. In the first week after the *Tegetthoff* was abandoned, whenever Weyprecht encamped at the end of the day's march, Haller, Zaninovich and I returned in the dog sledge to the ship in order to replenish the stores we had consumed. The distance which we had taken a week to pass with all our baggage, was done by the help of the dogs in an hour or two. In these different visits we did our utmost to fulfil the commissions of our companions. We rummaged the hold, though in many of the cases we opened, nothing was to be seen but a dressed bearskin. In one of these trips we filled a small cask with a concentrated decoction of all the tea which was left behind, and the rum we found was used to give it the proper strength. When we returned to the boat-parties before the morning start, this still lukewarm decoction of tea and rum met with great approbation, but the greatest was reserved for the remains of the condensed milk we brought with us, not merely because it was milk, but because to us it was the only milk in the world. Round the remains of the bears we had killed, we always found flocks of sea gulls screaming and quarrelling. Sometimes too we saw bears prowling round the ship at a distance, waiting till their time for plunder came. They seemed

to wait for the moment when they should be able to take permanent possession of a fortress which had been so long hostile to their race.

5. But we had the benefit of their company through the earlier part of our journey. May 23, a bear was shot by Weyprecht, and forthwith the gulls, who always turned up, whenever there was anything eatable to be got, consumed the remains with astonishing rapidity, even to the bones. On the 26th, when I was about two miles from the advanced parties, fetching something which had been left behind, I suddenly sighted a bear at about 100 paces distant, lying in the snow and apparently asleep. The dogs too got sight of him, and I had much trouble in keeping them in, till I overturned the sledge to act as a breastwork. As the bear rose and stood on his hind legs I fired, but though severely wounded, he managed to crawl away. The dogs, rushing off with the sledge behind them, assailed the wounded animal with a fury which would have been fatal to them, if the sledge had been checked by any obstacle. Torossy specially showed a complete ignorance of how matters stood, and was saved by Jubinal from the paws of his assailant. Whenever the bear came up to the sledge, Jubinal swung round with it, till I came up so close as to make sure of killing it with my last cartridge. On the 31st, Klotz shot a bear which came within ten paces of the boats;

but notwithstanding this addition of fresh meat, the stores we brought in the dog-sledge from the ship maintained their charm.

6. A few days after the abandonment of the ship, dark masses of clouds, indicating open water, were seen in the south-west, which doubtless proceeded from the fissures we had observed three weeks before from Cape Brünn. There was good ground, therefore, to hope that we should get beyond the land-ice in a few days, and reach the network of ever-changing "leads." If we succeeded in this, we might then launch the boats in one of these water-ways, and following the windings of its course between the fields of ice, escape to the south with greater rapidity. Our most sanguine expectations were exceeded when, on the 28th, we reached unexpectedly a small flat island, the very existence of which was unknown to us—Lamont Island. Ascending the highest point of it we saw an "ice-hole" stretching to the south-east, in which was floating an enormous table-shaped iceberg. This "ice-hole" was not more than a mile from the southern extremity of the island, which was itself still surrounded by forced-up blocks of ice. A driving snow-storm detained us on the 29th on the island, and we contented ourselves with gathering pieces of drift-wood lying on the shore. On the 30th we delayed no longer in our

attempt to advance to the edge of the floes and launch our boats. But our calculations were doomed to disappointment; after a toilsome search of several days to find a suitable spot from which to launch our boats, we were convinced that this was for the present impossible, because the edges of the "ice-hole" were surrounded with broad barriers of broken ice, ren-

IN THE HARBOUR OF AULIS.

dering the passage of the boats and sledges impossible. Weyprecht and Klotz had meanwhile started to reconnoitre, and their report on their return showed that sledging, for the present at least, was at an end. The ice-hole before us extended far eastward, and the attempt to outflank it would have led us through walls of ice piled up to the height of fifty feet. We went back, therefore, to the more level surface of ice we had left,

and pitched our camp, which we called the "harbour of Aulis;" for, like the Greeks of old, we had here to wait for more favourable winds. Winds only could open the ice before us and widen the "leads" into a navigable condition. We had never kept at any great distance from our boats while engaged in transporting their heavy loads, but henceforward we were careful to keep close to them, as we had every reason to look for the speedy breaking up and separation of the ice. We were now in 79° 46′ N.L., and therefore only five miles from the ship. Cape Tegetthoff was still distinctly visible on our northern horizon.

7. The space in the boats being insufficient for the crew and all the baggage we had to take, Weyprecht determined to send back Orel and nine men to bring away the jolly boat which had been left behind, and I went on in the dog-sledge to help in the work of removing more stores from the ship. It took me just three hours to do the distance, which it had cost the advanced parties eight days to accomplish. The activity of the dogs received a fresh stimulus from their coming on the track of a bear running in the direction of the ship, and when we came within 1,000 yards of it, there we saw our enemy, who, however, thought it more prudent not to await our attack. On the 7th of June the equipment of the jolly boat was completed, and we returned to our

companions with a load of 3 cwt. of boiled beef, shot, and other necessaries. The old track, now well trodden down, proved a great advantage to us. If we had deviated a single step, we should at once have stuck fast, for the character of the snow had altered, and where it lay in masses it had become mere sludge. The temperature, which at the end of May had varied between – 3° and – 6° R., rose, on June 1, to zero, and remained steady at that point for some time. Even during the weeks of midsummer the temperature rose only a few degrees above zero. On the 3rd of June it rained for the first time, and gradually the weather assumed the character of fogs and driving mists so common to the Arctic Ocean. Clear days were of rare occurrence, and occasionally only, the sun shone for a few hours. On our return to the boats we found their crews were sitting up and looking out, like young birds in a nest, to see what we had brought from the ship. Tobacco was regarded as a right royal gift, and Dr. Kepes, to whom I gave a shirt-sleeve well stuffed out with the precious weed, regarded himself as a Crœsus.

8. Meantime our longings to launch grew apace; anxiously we looked for the widening of a fissure to enable us to advance southward. We attempted again and again to approach the "ice-hole," but always found insuperable difficulties to bar the way. The

effort to get one of our boats into a dock we had hewn in the ice nearly ended in its loss, and nothing was left to us but to repeat the flank march along the fatal "ice-hole" to the "harbour of Aulis," there to watch for the breaking-up of the ice. Throughout the day we sat penned up in the boats, worn-out with a feeling of indescribable weariness, each morning longing for the end of the day, and at every meal thinking when the next would be ready. It seemed as if the time for launching the boats would never come. When the hoarse melancholy scream of the Burgomaster-gull sounded through the stillness of the night, it seemed like a demon voice from another world, proclaiming that all our efforts would avail nothing to deliver us from the icy power which held us in its grasp. A visit from a bear was a welcome change in the monotony of our life.

9. We were now in the middle of June. Winds from the south still prevailed, and we were close to the ship at the expiration of some weeks; the third part of our provisions was consumed, and of the 250 German miles between the ship and coast of Lapland, we had accomplished but one mile and a quarter. If this should continue to be the rate of our progress, we had the prospect of reaching home in twenty years! Yet gloomy as things appeared, there were

moments when we were tempted to think that the end of our trials had come at last. Thus, on the 17th of June, an "ice-hole" opened close to us; instantly we prepared to take advantage of it. The day was perfectly clear, and though the temperature in the shade stood at zero (R.), it was to us an African heat. We

WE LAUNCH AT LAST.

threw down the walls of ice, levelled a track for the sledges, and that night we stood, with all our baggage, at the edge of the open water, and, on the morning of the 18th of June, we at last succeeded in launching our boats and putting all our baggage on board. The sledges, fastened to the boats, were towed in their wake. The dogs were put in the different boats,

Jubinal alone taking kindly to his new abode, seeing doubtless that he would have to sleep no longer on snow. After drinking some tea with the last remains of our rum, we pushed off, steering towards the south, and it was a sure sign of the elevation of our spirits, that three and twenty tobacco-pipes were immediately put into active operation. Our progress, however, was but small, scarcely more than one mile an hour, which was fully accounted for by the deep lading of the boats and the towing of the sledges. We might have sailed about three miles, steering in a southerly direction, when a heavy floe stopped us, and, progress for the time being impossible, we drew the boats up on the ice and went to rest. Soon after, snow began to fall, and a west wind set in, which gradually veered to the south, and the floes were again forced together, and we found all the "leads" closed up when we attempted to move on in the morning. Again we had to wait, but with this difference, that we were now at the mercy of the wind, which might drive us with the floe, on which we happened to be, wherever it pleased.

10. On the 19th of June we had to lie still in our boats, but next day we were able to push them to the edge of a fissure, into which we let them down, unlading them and lading them afresh on the opposite side; our progress during the day thus amounted to a mere change of encampment from one floe to another floe. The absence

of navigable "leads" prevented our advancing further. Our position remained unaltered for the next two days, the only event that occurred being the shooting of a seal (*Phoca Grœnlandica*), which sufficed to make the soup we had for supper somewhat more palatable. He had fallen to the gun of Weyprecht, who proved to be the luckiest of us all in seal-hunting, in which only the persevering succeed. Every seal that was shot was of course a saving of the stock of our provisions, and hence the killing of these animals was a matter of extreme importance to us, and the preservation of our lives depended in a very great measure on our success.

11. Nothing can give a better idea of our life at this period than a few quotations from my journal :—

"*June* 23.—Things have improved a little towards the south; in the forenoon of this day we passed over two water-holes and two floes, thus advancing about a quarter of a mile. The intervention of a third floe hindered us from penetrating into another 'ice-hole.' After midnight the ice again opened, and we sailed several hundred paces further.

"*June* 24.—Early in the morning Orel shot a seal of unusual size. We dragged on for half a mile over a large field of ice to its southern edge, but found, on our arrival there, that an accumulation of smaller floes barred our advance.

"*June* 25.—We could not sail a bit further; winds from the north-east prevailed; our latitude was 79° 16′. After leaving the ice under the land, the depth of the snow considerably diminished, so that the sledges on which the boats were placed could be dragged on much more easily than before. There were, however, no pools

MARCHING THROUGH ICE-HUMMOCKS.

of thaw water on the ice, though we had observed such much earlier in the preceding year.

"*June* 26.—Several hours occupied in passing over ice-fields and small 'ice-holes.' During the halt at noon a bear came within twenty paces of us, but seeing so many men in motion, ran off. The ice appeared to be last year's ice, and was much crushed,

Orel at noon took the latitude by sextant and artificial horizon, and found it 79° 41′—bitter disappointment.

"*June* 27.—With a fresh north-east wind we sailed to-day over a larger 'ice-hole,' our latitude at noon being 79° 39′. In the afternoon we dragged our sledges for a quarter of a mile over an ice-field, and our baggage had so diminished that I had to drag with the dog-sledge not more than 7 cwt. In the lee of large ice-fields, which act like islands, we find sometimes somewhat more open water-ways.

"*June* 28.—Two ice-fields and two 'ice-holes' were crossed to-day. Progress, though small with the boats, would have been simply impossible with a ship, which could not, like boats, be dragged over floes. Falls of snow and gleams of sunshine alternate with each other. While the rest slept, a watch was always posted outside the boat to observe the behaviour of the ice, and to give us timely notice of the approach of a bear.

"*June* 29.—Two or three small 'ice-holes' and some ice-fields were crossed to-day. The last ice-field we dragged over was of considerable extent. To-day, for the first time, we made the attempt, with great success, to force the boats through narrow 'leads' by means of poles. Another seal was got. Every one of us had now learnt, by force of habit, to eat half a pound of seal-blubber with our tea at noon, and to eat it with pleasure.

It was some comfort to the more delicate and sensitive to be assured that it tasted like butter, and many experiments had been made on the edibility of the fins during the last few days. Kane came to consider seal-fin as a kind of salad. We cooked it in our soup, and the dogs at last went beyond us in the high estimate they placed on this article of diet. It is worth remarking, albeit it seems to be a contradiction, that though we had all an abhorrence of fatty substances during the sledge-journeys in the coldest period of the year, we now took to them with great relish when the weather was warm. In fact we never felt better than after a noon-day meal at which we had consumed a considerable quantity of blubber. Our digestion was particularly good, and those who suffered from stomach complaints, produced by the continuous use of pease-sausage, ceased to be so affected. The real ground of this abnormal preference of fatty substances was doubtless the fact that we had now abundance of drinking water, and did not suffer therefore from thirst.

"*June* 30.—A small 'ice-hole,' and then a large ice-field, were crossed, and as we were in the act of passing over a 'lead' filled with broken ice, it suddenly closed, and we had to draw our boats up again, and to wait till the ice should part asunder. The snow has become quite soft, and we find water at the bottom of a hole,

and employ it for the first time for cooking. Cape Tegetthoff and Salm Island are still visible. The dogs to-day drew 12 cwt., and are quite exhausted. I had my hair cut by Klotz, and, with many apologies for my poverty, offered him some water in compensation

HALT AT NOON.

—an offer he declined. In the Arctic Seas, even to the doctor, a glass of water is a handsome fee."

So it runs on for weeks together in my journal; and if it be tiresome for readers to follow such repetitions, how much more wearisome must it have been to live through and experience them! Yet if it were possible for our

situation to become worse, it did so during the first half of the following month.

12. On the 1st of July the whole of our day's labour consisted in passing over a fissure. The observations taken at noon gave 79° 38′ as our latitude, so that during the last four days we had gained one single minute only. Next day we lay amid fragments of floes closely packed

CROSSING A FISSURE.

together, and there were neither "ice-holes" nor fields of ice over which we could pass. On the 3rd of July we crossed some fissures with great difficulty and traversed two small ice-fields, but a wind from the S.E. set in, and our observations showed 79° 38′ N. latitude; while we discovered from our longitude that we were only four miles to the east of the ship. The small amount of

drift discernible in the ice, with such strong winds, was a sad sign of its closely packed condition.

13. With imperturbable patience we continued to drag our heavy loads over the ice, and on the 4th imagined that we had penetrated a mile in a southerly direction; but the wind from the S.E. blew so persistently that when we took our observations on the following day we found our latitude 79° 40½′, and that we had thus been actually driven back towards the north-west, and that the toils of the last three weeks had been fruitless. On the 5th and 6th the ice lay before us in piled-up masses rendering progress impossible, and we were compelled to rest, consuming our provisions without getting one step further. Our seal-hunting also on those days was seldom successful. For hours the hunters lurked round the edges of ice-holes, sometimes without seeing a single seal come to the surface; and when at last the animal did make its appearance, it very often sunk after it was hit, before a boat could be launched. Those we saw on the edges of ice-holes showed a dexterity in diving out of the way of mischief which failed, as things were, to excite our admiration. The bears, even more than the seals, showed a prudence and caution which their previous behaviour had not led us to expect. On the first of those days a bear came pretty near us, but the dogs, alas! rushed at him and drove him away. Henceforward when

the dogs were not dragging they were secured with ropes, but our prudence came too late.

14. On the 7th there was no change. The day passed away in moving from one floe with rotten edges to another somewhat more firm. We only shoved our boats a few hundred yards through the lakes of thaw water which had formed themselves on the ice. Our latitude was 79° 43′.

15. On the 8th we got away in a narrow "lead" a few hundred paces southward, but after getting so far we were stopped by thickly-packed ice, and again we had to draw our boats out of the water and recommence our life of painful expectancy—watching for the ice to open. No one of the party suffered so much from this depressing state of things as Carlsen. For more than twenty years the old and tried "ice-master" had lived amid floes and ice-blinks, manfully and successfully fighting against the hardships of the Arctic Seas, and now that frailties had increased on him, he saw himself compelled to such toils and privations as would have taxed his strength even in his prime. The old polar navigator bore his burthens without murmur or complaint, though it was painful to others to see the signs of exhaustion in his appearance. He no longer spoke of the polar bears and walruses, which he had entranced by a glance of his eye or bewitched with one of his words of magic. Even the puritanical

zeal with which he once rebuked and lectured the Slavonians for playing cards on "God's holy day" had grown somewhat cold, and his fears lest the conversations of the lively Southerners should end in blows became even more intense.

CARLSEN.

16. It was a strange life this abode for weeks of summer in boats covered over with a low tent roof. Oars by way of furniture, and three pairs of stockings for each man's mattress and pillow. My journal describes these days: "Four boats are lying on the ice, crammed with sleeping men: and so great is the heat in them, that no one

needs his fur coat, and snow placed in any vessel becomes water in a few hours. If Torossy has not ushered in the day by barking, the cooks do it when they bring the bowls of soup to the boats with the cry 'Quanta!' Then ensues a short scene of confusion: spoons and tin-pots have to be searched for and found, till at length quiet is again restored, after a little ransacking, and each man has his pot full of hot soup in his hand, consisting of meal, pemmican, pease-sausage, bread-dust, boiled beef, seal, and bears' flesh; when the soup is flavoured with seal-blubber it is called 'Gulyas.' The soup is consumed amid perfect silence—not a word is spoken; what indeed was there to be said, which was not already known, or which had not been said a hundred times before? Each one knows the other's history from his cradle downwards. A stillness like death reigns over all the surrounding forms of ice, and the frozen ocean stretches out beneath a vast shroud. A sunless leaden sky spreads over all, not a breath of air stirs, it is neither warm nor cold, slowly melts the snow, and this pale realm of ice forms a world of danger and difficulty, against which are matched the strength and sagacity of three-and-twenty men!

"Again all have taken their places in the boats to bale out the thaw water, the great enemy of their health—and of their solitary pair of boots. He whose turn it

is to hunt the seal squats at the edge of a floe before a fissure, which admits a few square feet of water, in which no seal will show himself, because he has scarcely room to turn in it.

"To the others, their abode in the boats is a time of manifest weariness and ennui. Happy the man who has any tobacco, happy he who, after smoking his pipe, does not fall into a faint; happy too the man who finds a fragment of a newspaper in some corner or other, even if there should be nothing contained in it but the money-market intelligence, or perhaps directions to be followed in the preparation of pease-sausage. Enviable is he who discovers a hole in his fur coat which he can mend; but happiest of all are those who can sleep day and night. Of these latter some have stowed themselves away under the rowing seats, and above them reposes a second layer of sleepers, but nothing is visible of either party but the soles of their feet. No paradise of bliss! Noon comes: a little tea is made over the train-oil fire, each gets one cup of it and a handful of hard bread-crumbs—a kind of dog's food which the impartial committee of provisions' measures out with Argus-eyes. The fourth part of the skin of a seal is thrown into each of the four boats, and the blubber on it is eagerly devoured. Some, for the sake of the fins, the ribs, or the head, become guests of the dogs. Flocks of gulls settle impudently near

us, screaming and fighting for every morsel they can reach. Some of us try to catch them with nets, but no sooner are the nets up than the gulls disappear.

"The formality of dinner is over, and we have come to such a pass that even the tea excites the nerves of the community, and some Troubadour will then raise his voice with a *bravura* such as might have been heard on San Marco. The end of the Franklin expedition, and the history of the two skeletons which were found in the boat, is told again for the twentieth time—a story which never fails to produce a harrowing effect, and to rouse the firm and resolute to yet greater efforts and self-command.

"The most animated conversation, however, or rather a constant chattering, is going on meantime in the soot-begrimed tent of the cook. A difference of opinion arises about the precise time when the kettle was to be scraped out, or about the curtailing of the allowance in the last distribution of salt, or as to the delinquent who made a wood-fire on a cask of spirit, or who, instead of untying, cut the string of the sledge packing; many flourishes of speech are bandied to and fro, which at any rate speak well for the oratorical gifts of the disputants.

"There is still, however, one solace left us, the solace of smoking. Some indeed have already exhausted their

whole stock of tobacco. He who has half a pouch of it at his disposal is the object of general respect, and the man who can invite his neighbour to a pipe of tobacco and a pot of water is considered to do an act of profuse liberality. Tobacco becomes a medium of exchange among us, and provisions are bought and paid for with it, its value rising every day. There is no difference between day and night, and Sundays are only distinguished by dressing the boats with flags."

17. In this enforced idleness passed away the days between the 9th and 15th inst., save that on the 14th we changed our place by three hundred yards, in order to select a more convenient spot for seal-hunting and to keep up the appearance of travelling—but in truth only the appearance, for in reality our situation had become truly dreadful. There were no events of sudden occurrence either to excite or alarm us, but time flowed on, and our constantly diminishing stock of provisions, like the steady movement of the hands of a clock, spoke with a plainness of speech, that could not be resisted, of the doom impending over us. Hitherto we had patiently endured the severe labours of dragging our heavily-laden boats and sledges from floe to floe, of launching the boats in the small fissures, and again drawing them on to the floes, when the ice became closely packed, often too carrying all the provisions and

baggage as we slowly crept along. The least progress was sufficient to fill us with joy and thankfulness. Meanwhile the ice on all sides lay closely packed, and many times we had to wait for a week in our boats on a floe, till the "leads" were pleased to open, while every empty tin case proclaimed, with fearful distinctness, the diminishing of our provisions and the gloominess of our prospects; and now a steady wind from the south destroyed the little progress we had made. *After the lapse of two months of indescribable efforts, the distance between us and the ship was not more than two German miles!* The heights of Wilczek Island were still distinctly visible, and its lines of rocks shone with mocking brilliance in the ever-growing day-light. All things seemed to say that after a long struggle with the supremacy of the ice there remained for us but a despairing return to the ship and a third winter there, stript of every hope, and the Frozen Ocean for our grave!

18. Such reflections and prospects were not calculated to raise our spirits or promote calm and deliberate thought, and it was happy for us that the earth was round, and that we were thus prevented from seeing how much ice lay between us and the open sea. No measures were left untried which promised to facilitate our progress or prolong our lives. We ceased to cook with oil, and used spirit instead, in order to lighten the

boats. The rations of bread were diminished; even our faithful companion little Pekel fell a victim to necessity. Seals played a greater part still in our *cuisine*, and everything seemed to depend on the successful use of the four hundred ball-cartridges which still remained in store. On the 15th of July a walrus showed himself close to the boats, but when we made a rush upon him to finish him he disappeared under the waters, and heavy rain drove us back again into the boats. Up to this time all signs of a happy termination of our venture seemed to have disappeared; but the hour of our liberation and escape was nearer than we thought.

19. On the evening of the 15th of July, after finishing our supper, a line of small "leads" running to the south-west opened itself, and we forced our way for about a mile against wind and current coming from the same direction. Next day, July 16, the wind blew from the north-west, and after our boats had been nearly crushed by the ice closing in some smaller "ice-holes," we ran into a broader and longer "lead." At noon of this day our latitude was 79° 39′, and we had gone so far that the highest points of Cape Tegetthoff and Wilczek Island were barely discernible—blue shadows surrounded by an edge of yellow vapour, and over the whole a heavy water sky.

20. Up to this date we had been compelled to cross

SCENE ON THE ICE.

every fissure, a procedure as exhausting for us as it was detrimental to the boats. The least impediment, such as the stoppage of a "lead" by some pieces of ice, had sufficed to cause us hours of laborious efforts. The ice lay thick and close, and its floes were firmly frozen together. But now it was not only somewhat opened, but seldom cemented by frost, and the efforts of fifteen or twenty men generally sufficed to shove apart any two floes with long poles, or remove any barrier which closed a "lead." If the "leads" closed in, so that there was danger lest the boats should be crushed, the crew jumped out and hauled them up on the ice.

The accompanying sketch exhibits one of the scenes that occurred almost daily—the pushing the floes asunder with long poles, in order that the boat might pass between them, while the rotatory motion of the floe closes the fissure in the foreground, so that another boat has to be drawn on the ice as quickly as possible. The baggage of the boat is represented partly as packed on a sledge, or partly lying on the snow, and the men and dogs stand ready to drag it over the floe to the next place of launching. Two other boats, which have found the "lead" open, are on before, and one of them is lying at an ice-field which has to be crossed, waiting for the others to come up.

21. It sometimes happened that we could not push

the floes asunder, and we were then compelled to cross them; and in those cases where the floes were a mile or more in diameter, our progress took the form of sledging. The provision was sent on for some distance to the nearest water, and the boats, which remained behind under the care of the less able-bodied of our party, were lifted on to the sledge, when it returned by the rest of the crew, and firmly secured. The smallest of our boats was shoved through the snow while the dogs with their sledge transported the bags of bread and the spirit.

22. An advance of four miles a day now sufficed to satisfy us, and we had acquired such precision in our arrangements before starting that three hours sufficed to accomplish them. If the sledges came on obstacles from the ice, the pioneers hurried on with picks and shovels to remove them. Lakes on the ice were made little of; we waded through them with much equanimity, and any one who fell into a "lead" while the day's labour was going on seemed to take the accident very coolly. On the 17th of July we had passed, in the way I have described, three ice-fields and three small "ice-holes;" but on the following day we made very little progress, because a wind, setting in from the west, packed the ice closely. We were therefore overjoyed to find our latitude to-day 79° 22′, a result which could only be ascribed to the late north winds; but we could

not quiet our fears, lest a wind from the south should deprive us of our dearly-bought advance.

23. We now penetrated into a region full of icebergs, many of which were covered with earth and moraine dirt, which made them look at a distance, amid the dazzling uniformity of the ice, like rocky cliffs. In the evening a she-bear was seen close to us, which came full tilt at our dogs: at thirty paces off she was hit, but not mortally, and fell; but getting up again, ran off to an ice-hole, and remained long enough on its surface to be secured by the harpooners. She afforded us as much food as four small seals, and some of our party, with the voracity of beasts of prey, scraping the flesh off the bones for their private use, carried it about with them wrapped in their pocket-handkerchiefs, and ate about a pound of it raw every day at noon, as long as it lasted, after merely washing the carrion in sea-water.

24. On the 19th of July we again passed over several small ice-fields, and on the 20th and 21st one several miles in diameter. We were favoured with a north-west wind, and on the 20th of July our latitude was 79° 11′, our longitude 61° 3′, and our progress was so brilliant on the 22nd (79° 1′ L.), that we were compelled to draw the boats twice only out of the water, and warping through narrow "leads," came again to larger "ice-holes," over which we were able to sail. Our spirits were greatly

raised, and we went on full of hope that we should soon come into longer water-ways, which would exempt us from the toils of crossing floes with the sledges. On the 23rd sudden squalls from the E.N.E., accompanied with heavy showers of rain, detained us in our covered boats, and our whole business on this day was collecting the rain-water in an empty spirit-cask and drinking it as grog. On the 24th we again made good progress. The rain fell in torrents, and we were wet through and through, and at night we lay down to rest reeking. The rain continued, but good progress was made almost without interruption during the next three days. We bore all the discomforts with joy, because the rain powerfully and rapidly dissolved the ice.[1] Our clothes were constantly wet, but we eagerly snatched every gleam of sunshine to dry our stockings or our saturated boots.

25. The cooks, when they called us in the morning, now constantly drew such pictures of the day's prospects, that we might have been tempted to believe that during the night all the ice had disappeared; but this pleasing illusion was rudely dispelled whenever we stepped out of the boats into the open air. These good men, having no compass to consult, always flattered themselves with the notion that where water was to be seen, there also lay

[1] It was Parry's experience also that nothing melts the ice like rain.

the south. But, alas! there lay the ice-hummocks, and there, too, lay the boats and sledges to be dragged as before. Klotz went a little further; it was his opinion that we ought always to take to the water without fear, even if it stretched to the north, in order, as he said, to get home round the North Pole.

26. On the 27th we had reached 78° 48′ N.L., but a wind from the south-west set in, and after two days of constant toil, alternately launching and drawing up the boats, we found, on the 29th, that we had been driven back to 78° 50′ N.L. But in many cases the movement of ice is unaccountable, and on the 30th this was verified; for, notwithstanding the prevalence of the south-west wind, we had drifted to 78° 32′ N.L., 61° 3′ E.L. The weather at this time was thicker and duller than usual, and the horizon from our boats extended but a few hundred paces, so that we had considerable difficulty in choosing the most navigable "leads." The view did not extend above two miles, even when we climbed to the top of one of the hummocks, and mists generally lay on its outskirts. In clear weather we had always steered in the direction of a water-sky which promised open sea, even though we had to make *détours* to the south-west or south-east. But now such a foggy obscurity lay over every "ice-hole," however small, that the outline of its edges was hardly discernible at

a few paces off, and, under these circumstances, we could only pull the boats round, till we came to the first opening in the enclosing ice.

27. Winds from the south continued during the following week, and heavy rains again fell, and we had much laborious dragging through the fog on the 31st of July and the 1st of August. Our stock of bread, which had been reduced to powder by the constant lading and unlading, was meanwhile so thoroughly soaked that on the 2nd of August we stopped for half a day on a floe (78° 28′ N. L., 61° 49′ E. L.), to dry it in the sun, which, after a long absence, gladdened us by showing himself. We took the opportunity also to dry our clothes and our stockings. On such a day as this the scene around us entirely lost its gloomy sepulchral character; the heavens were brilliantly blue, the ice lay around us in dazzling light, and the deep ultramarine of the sea-water peeped forth from the "leads." Henceforward we had less occasion to cross large floes. Our route gradually changed its character; "leads" and "ice-holes" occurred far more frequently, and the channels between them, winding through drifting islands of ice, were sometimes three or four miles in extent. Along these we glided under sail and oars, and when we came to a temporary halt, Weyprecht, with his compass, mounted one of the ice-hummocks to examine the water-ways

and determine which we should follow. Our rate of progress was much increased, an acceleration due to the change in the ice, effected slowly but surely by sunshine and rain. The enormous masses of snow were wasting away; the thaw water, gathering in countless streams, spread as lakes on the hollows of the floes, and oozed through fissures in the ice into the sea. The edges of the floes, undermined by the action of the waves, fell in, or were worn away by the pressure, and a single warm day or shower of rain sufficed to dissolve what remained of them. Hence, if the difficulty of drawing boats on to the ice was lessened, the danger of breaking through it in the process was greater, and we ran the risk of seeing all the cases containing our provisions sink in the sea before our eyes. As the ice-fields diminished in size and thickness, the number and breadth of the "leads" increased. The alternation of heavy south-east winds and calms helped on the destruction of the ice, and our progress was great in proportion. From the 3rd to the 7th of August each day we accomplished greater distances. The ice gradually changed from pack-ice to drift-ice, impenetrable only where it lay in thicker masses. When fogs came on, we generally decided, after wandering about for a little, to wait on or near a floe for finer weather. We no longer restricted our labours to certain

times of the day. In the highest spirits, we toiled incessantly at rowing or dragging the boats, or shoving the floes asunder with our long poles.

28. On the 7th our progress might be estimated at twelve miles. It was the first day we had got on without dragging the sledges and crossing floes, and when we halted at noon amid some loose ice, we saw, to the south, a fluctuation in the sea level, and the ice alternately rising and falling. "The swell of the ocean!" exclaimed all with joy; "we are close to the open sea"—the open sea being to us at that moment deliverance. Our amazement at finding it at such a latitude, 78° N.L., was so great that, notwithstanding that indisputable sign, we could scarcely believe our eyes, and we were filled with indescribable excitement. For a moment only that excitement was diverted to other and very different objects—two bears suddenly appeared on the scene, swimming about 100 paces from us. Two boats were at once manned, and the chase began. But the bears swam faster than the boats could be pulled by the four men in each boat; sometimes they raised themselves high out of the water as they turned to look at their pursuers. Suddenly one of them disappeared, while the other made for a floe and climbed on to it. As he stood and imprudently stared at us, a shot was fired at him, and he immediately decamped, swimming with

great rapidity to another distant floe. But as no trace of blood was to be seen on the ice, and our companions drinking their mid-day tea were scarcely to be distinguished, we considered it unsafe to pursue him further. In the evening we stopped again before a dense group of small floes, which like the rest of the ice had become

BEARS IN THE WATER.

rotten; the one whereon we were preparing to encamp for the night broke into several pieces just as we were raising our boat on to it. We were, however, fortunate enough to save our provisions.

29. Though we had been accustomed so long to oscillate between extremes, we now felt that the hour had come, when we might count with certainty on being liberated

from the fetters of the ice, and all our hopes gained new life. Yet once more they seemed doomed to be disappointed. On the 7th, before we turned in to sleep, the prevailing north wind had gathered so much ice around us that we were fairly shut in. Next day (August 8), after the efforts of many hours to force through the multitude of small floes by which we were jammed in, we discovered that we should be unable to move, unless the wind changed to the south-west. Our exertions on the 9th were equally unsuccessful. It was not dense masses of ice, under whose walls we had so often felt ourselves imprisoned, that now held us captive, but miserable flat floes. Their diameter was from fifty to sixty paces, and though they hardly appeared above water, they were not the less impenetrable hindrances. The movement in the sea, that had so elevated us, was scarcely perceptible, and our faith in the nearness of the ocean was consequently much shaken.

30. Again rain fell in abundance, and we remained in the boats waiting for the breaking-up of the ice. It was scarcely possible to go any distance from them, for the ice of the surrounding floes was so thin, that we could not venture to walk on them lest we should break through. Fissures abounded, but no seals were to be seen in them. This forced abode in our boats was almost unendurable. We could not always sleep, and only a frugal few had any

tobacco left to smoke. Some of our party had for a long time smoked dry tea-leaves in the form of cigarettes, or had filled their pipes with match paper. All the tinder had been long used up in this way, and a dreadful trial it had been to the olfactory nerves of those who would not so indulge. Haller went further still, and smoked paper in the close covered boat! Besides many leaves of his note-books, he still had a quantity of packing-paper, but, in the interest of the community, I was compelled to interfere against its use in this fashion. He found some compensation in another occupation, which had the merit at least, of being inoffensive to others—mixing together his rations of tea, salt, and bread-dust, he converted the mixture into a soup. These days seemed as though they would never end; there was a continual taking off and pulling on of boots; some sat in the boats gaping about vacantly in all directions; some standing on the ice gaped as vacantly; all mental activity was concentrated in two wishes, that the ice would break up, and that the time for the next meal would come round. No one had any private reserve of provision. The days were gone when a stocking filled with bread might be seen hanging from the belt of one, or the ribs of a bear in the hand of another. And yet amidst all the hunger, which we felt the more acutely from our abundant leisure, some among us had

actually become as plump as quails, and if we had been found dead on the floes, it would have been thought, that we had died in consequence of over-eating, so stout had most of us become. But dreadful was the solemn lapse of time. August was well advanced; the knowledge that we had provisions for only one month more, and the shortness of the season for action that still remained, failed not to impress upon us all that the crisis of our fate was at hand. For three weeks past the formation of young ice had begun, both on the ice and on the sweet-water lakes on the floes. Even during these summer months, the temperature in the night had frequently fallen two or three degrees below zero (R.), and the cold now began to join the fragments of old floes into formidable obstacles. The caprice of a wind might again carry us off towards the north, as it had done two years ago, but carry us too, to certain inevitable destruction. On the 9th of August we found our latitude 78° 9′—a higher degree than we had expected. But what would a lower degree have availed us, had not the open sea been near us—the open sea, on which hung all our hopes, ever since the word had been uttered? The joy of that day's discovery was fed and sustained by the low murmur of a distant surf, which either imagination or our senses, rendered acute by the presence of danger, continued to hear in the south.

31. Thus passed the days from the 10th to the 13th of August, the calking of our boats forming our only distraction. Eagerly and earnestly we gazed on the water-sky in the south and on every change in the ice.[1] On the 10th our latitude was 78° 6′ and our longitude 60° 45′, E.; on the 13th our latitude was 77° 58′, and our longitude 61° 10′ E. On the 12th the ice had

CALKING THE BOATS.

become somewhat looser. We advanced a mile to the south, but were then again beset. It rained during the whole day, and in the night, the temperature fell several degrees below zero (R.). Ice an inch thick

[1] The wind maintained its westerly character, and we drifted, as we had so often before, to the *right* of its direction.

was formed on the 13th over the surface of the fresh-water lakes, and when we went, either to drink from them or to perform our toilet, we had to break through a coating of ice. All these were so many signs that Summer had bid us adieu and that the short Autumn of the north had begun. This day, too, we had the first impression of the returning cold.

32. At last during the night of the 14th, the ice somewhat opened and we could go on our way. Just before we started, in the early morning, a seal was shot which the dogs had discovered and attacked: it was the eighteenth and last we shot since we abandoned the ship. With much labour in shoving we forced a passage through a long succession of "leads" and halted for a short rest at midnight in front of a larger "ice-hole," to refresh our strength with some pieces of blubber, seasoned with alcohol and thaw-water. Drift ice lay all round us, and we had the presentiment, that the hour at last had come which was to set us free from the ice. All things rise in our estimation, when we are about to bid them farewell, and it was with some pain that we felt all at once, that in a few minutes we should bid adieu to the realm of ice, which lay behind us in all its magical grandeur. We now moved on under sail: the "ice-holes" increased in size, the ice diminished, and the swell of the ocean was perceptibly greater. Our latitude at noon next day

was 77° 49′. A large "ice-hole" opened before us, and with a sea running high, the boats, making a good deal of water, we sailed into it—it was the last ice-hole. The last line of ice lay ahead of us, and beyond it the boundless open sea!

FAREWELL TO THE FROZEN OCEAN.

33. About six o'clock in the evening we had reached the extreme edge of the ice-barrier, and once more, but for the last time, drew our boats on a floe. Again our ears heard the noise of the waves—the voice of life to us. Again we saw the white foam of the surge, and felt, as if we had awoke from a death-like slumber of years

to a new existence. But if our joy at deliverance was great, not less great was our astonishment to have reached the ice-barrier in the high latitude of 77° 40′; and with it the hope of final escape. We went to rest for some hours, but were roused by the watch about two o'clock in the morning. The east wind had gathered some heavy masses of ice around us, which rose and fell with the swell of the ocean, and we were already several hundred yards from the water's edge. Any delay in escaping as quickly as possible would require the labours of many days to set us free again. After much shoving with the poles, and lading and unlading, we again got beyond the line of ice. The frozen ocean lay behind us, and on our last floe we made preparations for our voyage on the open sea.

CHAPTER III.

ON THE OPEN SEA.

1. THERE lay the open Ocean before us; never were its sparkling waves beheld with more sincere joy, than by the small band of men, who, escaping from the prison house of the ice after fearful struggles, now raised their arms on high to greet its glad waters. The 15th of August was the day of our liberation—the festival of the Assumption of the Virgin—and our boats were dressed with flags in its commemoration. But it was no time for the rest and recreation of a Holy Day: graver duties pressed upon us. The boats had to be ballasted, and were with difficulty made to take on board the baggage, the water-casks, and the crews. Our four sledges, to which we owed so much of our success so far, were of course left behind. The dogs too were put on board, not, however, without much hesitation, when the contingencies of the voyage were considered.

2. With three hurrahs, we pushed off from the ice, and our voyage commenced. Its happy issue depended on the weather and on incessant rowing. If a storm should arise, the boats, laden as they were, must sink. We were soon convinced that the dogs, which suffered greatly from sea-sickness, would dangerously incommode us in the boats by destroying their trim. There was, in fact, no room for them in our over-crowded boats, nor water, nor provisions. We could not bring ourselves to abandon them, and our only form of gratitude for their services was, alas! the painful one of putting them to death. A floe, by which we passed, became the grave of these our true friends, our companions in all situations, and our helpers in all dangers! It was indeed a painful moment, when Jubinal was taken out of the boat to meet his death. It was the loss of a true comrade, who had never departed from my side, and who had patiently borne all the labours and toils imposed on him. Poor Torossy too, born in the Arctic regions, amid the ice-pressures, was not a little lamented.

3. With boundless satisfaction, we saw the white edge of the ice gradually become a line, and at last disappear. Every one felt, that finding the ice-barriers in so high a latitude, was the crowning blessing to which we must ascribe our liberation. At the distance of a mile from the edge of the ice, the temperature of the

water had risen to − 0°·7 (R.), and that of the air to + 3° (R.). The sunbeams were reflected with such intensity from the smooth surface of the sea, that we felt the long unknown sensation of heat, and were obliged to cast off some of our garments.

4. We shaped our course south-by-west, towards the Barentz islands, intending to take in supplies of provisions from the depôt formed by Count Wilczek, and then to coast along Novaya Zemlya in search of a ship engaged in the fisheries, which we hoped to find either at Admiralty Peninsula, or Matoschkin Straits, or in Dunen Bay. Norwegian vessels, engaged in the capture of the walrus, might be looked for as far south as Matoschkin Straits, and the Russian salmon-fishers still further to the south. The nearest land was fifty miles off, and everything depended on our reaching its friendly shores before the weather changed for the worse. In the event of stormy weather there would be no other alternative than to throw our provisions overboard in order to lighten the boats.

5. Putting forth all our strength, we rowed steadily for some days. Weyprecht took the lead in his boat, and the others followed him as quickly as possible. The crew of each boat was divided into two watches, who were relieved every four hours. It frequently happened that one boat fell behind the others, and was lost sight of in

a fog or mist. Trumpets and horns were then sounded, till the laggard boat, by renewed efforts of her crew, came up with the others. On the 16th, a breeze from the north sprang up, and we used our sails with good effect for some hours. At last Novaya Zemlya was sighted—some silvery points above the level of the sea, which our people took at first for the reappearance of the ice in the south; they proved to be the snowy summits near Cape Nassau. At this headland the mountains running along the coast suddenly cease, and the land trending to the north-east, assumes the monotonous character of glaciation almost without mountains, as far as the lonely shores where three centuries ago Barentz slept his last sleep.

6. Our progress now had no longer the paralysing insignificance of former days. This day at noon our latitude was 76° 46′, and on the 17th, the picturesque range of mountains south of Cape Nassau, rose through the morning mists close before us, steeped in violet and crimson hues. A fog arising, we rowed along by compass in the midst of it, the boats seeming to float in the air amid the fog. During its continuance, a current caused us to deviate so much to the south-west, that when at noon the land was again visible, we discovered that we had gone beyond the place where the depôt had been formed, and found by the chart,

that we were in 75° 40′ lat. and 58° long. But as the loss of time, in going back a distance of a hundred miles, was out of all proportion to the amount of provisions we could have taken in our overladen boats, we determined at all risks to hold on our course.

7. Before us, in the far distance, now rose above the horizon, the higher parts of Admiralty Peninsula; to these we now steered. As we passed along we made a vain attempt to land on the north of Gwosdarew Bay. We found the shores full of cliffs, between which a heavy surf was breaking, and could thus form some notion of the perils we should have encountered, had we attempted to land on the Barentz Islands. Two years ago the edge of this coast had been covered with firm ice, and the depôt had been formed by the aid of sledges. But now not a fragment of ice was to be seen on the west coast of Novaya Zemlya, and the rocky shore could only be approached by boats.

8. The differences between the climate in the years 1872 and 1874, were also in other respects very remarkable. In 1872 the mountains of the country were mostly covered with snow, but in 1874, it lay only on the higher parts of its glaciers, and in latitude 76° N., where we had found thick ice, the temperature of the sea was + 3° (R.), and of the air + 5° (R.). The phenomena of the climate of 1871, as we observed them

in the voyage of the *Isbjörn*, were similar to those of 1874; and this peculiar mildness was experienced on the eastern coasts of Novaya Zemlya by Captain Wiggins, who when navigating the sea of Kara as far as the mouth of the Ob, was shut in there by the ice for a few weeks only.

9. The inaccessibility of most of the places on the coast had hitherto obliged us to continue our course without going on shore to rest, although our arms were stiff and swollen with our exertions in rowing. No vessels as yet had been seen, and what we thought to be a ship turned out, when we rowed closer to it, to be only a small iceberg. There was therefore no other alternative than to coast along in a southerly direction, cutting across the bays, and keeping as near the shore as possible. On the night of the 17th we pulled over the broad Gwosdarew Bay, which was filled with countless fragments of glaciers. Some of the smallest of these we took on board our boats to replenish our fast decreasing supplies of water. Ever since our coming under the coast of Novaya Zemlya, we had entered a region where auks abounded, which whizzed over our heads with small crayfish in their bills in their flight to the land, or sat so indolently on the water, that they seemed determined not to get out of the way of the boats. Many were bagged, but we made no halt to shoot them. Twice only in the

day we rested for about ten minutes to take our food. Onwards we pressed, each boat striving to get before the others. On August 17 the sun set for the first time about midnight, and in the afternoon of the 18th we landed at a spot to the south of Black Cape, remarkable for the luxuriance of its vegetation. To our

LANDING ON THE COAST OF NOVAYA ZEMLYA.

eyes, accustomed to the monotonous white of snow and ice, it appeared like a garden. There was nothing to remind us of a polar region, either in the land, or in the temperature, or in the weather. Its broad bay, if it had been without its circle of glaciers, would have appeared like an Italian gulf. It was now ebb-tide, and wading in the water we shoved our boats, using the oars

as rollers, over the muddy shore. It was the birthday of our gracious monarch, which we celebrated in the best manner we could—we dressed the boats with flags, washed ourselves in a little fresh-water lake, and flavoured our weak tea with a small quantity of alcohol.

10. This was the first land on which we had set foot for months. Completely exhausted we lay down on its damp turf and listened to the pleasant sound of the surf. Flames soon rose from the pile of drift wood we collected, while some of us ascended the neighbouring ravines, and even gathered flowers.[1] There were quantities of forget-me-nots, and of coltsfoot (*Tussilago farfara*), which was dried and smoked, pronouncing it to be excellent tobacco. But our paradisiacal happiness could not be of long duration. The necessity of finding a ship as quickly as possible was urgent, and soon roused us from our deep sleep, while the thunders of the glaciers of Novaya Zemlya proclaimed to us that bad weather was not far off.

11. On the 19th, we coasted along Admiralty Peninsula; the thermometer giving +8° (R.) in the air, and +5° (R.) in the sea. Its shores rising in a succession

[1] Baer brought home from Novaya Zemlya ninety species of Phanerogams. According to an observation of Mojssejew, June 18, 1839, the thermometer in the sun stood at +27° (R.), and +12° (R.) in the shade.

of terraces were indisputable evidence of its gradual elevation above the sea-level,[1] and the flatness of the shores and the shallowness of the sea, interspersed with rocks, easily explain why they have so often been dangerous to ships approaching them in a fog. As we came further south the charts proved more trustworthy. At noon of the 20th at Cape Tschernitzky we reached latitude 74° 21′. We passed a number of picturesque bights on the coast, with mountains, whose tops were covered with clouds, and whose green banks extended along the shores. These are the favourite wintering spots of Russian expeditions, and in some places we saw ruined huts. On the 21st a fresh wind sprung up from the east. The sea rose, and as we sailed fast before the wind the boats took in a good deal of water, and we were thoroughly wet; the boats too got separated. We accordingly ran into the bay under "Suchoi Nos" (73° 47′ L.) to wait till the wind fell and the other boats should join us. The boat commanded by Lieutenant Brosch, was exposed to much danger from the lowness of its

[1] On older charts it is still separated by a sound from the mainland. The layers of drift-wood, which we found everywhere at a considerable height above the level of the sea, show beyond a doubt that the coast of Novaya Zemlya has gradually risen; but as in those latitudes this wood rots only after centuries, we have no measure to estimate the rate of this movement.

gunwale, when the sea was at all high; an addition made to it by a strip of canvas stretched round the boat proved ineffectual. We quickly dried our clothes at a fire made of drift-wood and erratics of brown coal which we found, but were much disappointed that no reindeer were to be seen, though we were surrounded by excellent feeding grounds for these animals. The stew, which we made from the spoonwort we gathered, and some pemmican, was but a poor substitute for the venison we had hoped to enjoy. Neither were there any Auks to be seen, and the Divers shot under the water like stones whenever we came within distance. The other boats having joined us we again put to sea, though the weather was threatening and a high sea running. In latitude 73° 20′ we ran into Matoschkin Bay, hoping and expecting to find a vessel engaged in the fisheries. But no vessel was to be seen, nothing but the outlines of an Arctic mountain-land. Carlsen also, whom Weyprecht had despatched to explore the straits so full of turnings and windings, returned without the intelligence we hoped for. Before Carlsen rejoined us we ran into a cove—Altgläubigen Bucht—and erected, on a conspicuous headland, a cairn, on which we placed a signal post made of drift wood. In this cairn we deposited a document, briefly describing the course of our expedition up to that date, in order to leave some trace of it in

a region which is visited annually by ships. The discovery of this statement in the course of the next summer would prevent our countrymen at home from sending out vessels to rescue us in higher latitudes, if we meantime should perish.

12. The prospects of our being saved had, in fact, considerably diminished, for all our hopes had been centred in finding a vessel in Matoschkin Straits, and these, as I have just said, were doomed to be disappointed. Carlsen now returned with the information, that, in the narrow seas he had visited, he had met with nothing but a whale-boat, lying keel upwards, round which were foot-marks of not very recent date. There was no doubt, therefore, that the fishing vessels had withdrawn from our high latitudes. At night a storm from the north-east roared over the cliffs surrounding the cove, and the surf breaking on the rocks reached our boats.

13. It was noon on the 23rd before we could continue our voyage. Our provisions would last for only ten days more, so that our fate must shortly be decided. Further delay was out of the question; there was but one hope for us—to press on and find a ship in Dunen-Bai (the Bay of Dunes). Should this too prove deceptive, we must then make the desperate venture of crossing the White Sea, direct to Lapland—a distance of 450 miles. To follow the vast circuit of the coast-line would have been

impossible to us with our stock of provisions, and at that season of the year. The next days too plainly taught us what would have become of our small boats had we been forced to attempt that passage.

14. We now rowed and sailed alternately down the flat coasts towards "Gänseland," amid stormy weather, during which the boats were often separated, and we almost exhausted our strength in baling out the water. We lost sight completely of Weyprecht's boat on the open sea, and of the others under the coast. That in which Orel and I were, appeared to have out-sailed them, and we, therefore, on the morning of the 24th drew to shore in a dark rocky cove to await the approach of our missing friends. Wet through and through we sprang into the shallow water, and by a great effort drew the boat to land. We then kindled a fire with the drift-wood we gathered, and after making and eating a kind of dumpling we sank down to sleep on the wet stones, amid the smoke from our fire, thoroughly exhausted. So passed away four hours. When we awoke we ascended a height, and as there was not a single vestige of a boat to be seen, we determined to put to sea again. Near Cape Britwin (Lat. 72° 40′), the wind and sea fell, and the boats again joined company. It was now deemed necessary to make an equitable division among the crews of the provisions that remained, and this being done, we took

to our oars once more, and pulled into the boundless waste of waters—into the mystery that hung over our destiny.

15. But the hour of our deliverance was nearer than we thought. It was evening as we glided past the black weather-worn rocks of Cape Britwin, the ledges of which were covered with flocks of birds, revelling in the spray of the surf. Then about seven o'clock a cry of joy as from one voice arose from the boats. A fifth small boat with two men in it lay before us, apparently engaged in bird-catching. They pulled towards us, not less amazed than we ourselves were, and before either party could explain itself, we turned a corner of the rock—there lay two ships.

16. It is with a certain kind of awe and reverence that a shipwrecked man approaches a ship, whose slender build is to deliver him from the capricious power of the elements. To him it is no lifeless machine, but a friend in need, yea, a higher creation than himself. Such were our feelings as we neared the two schooners which lay a few hundred yards off in a rock-encircled bay. To us at that moment these vessels were the sum total of the whole world! Dressing our boats with flags, we followed the strangers in their boat, and made fast to the schooner *Nikolai*, whose deck was in a moment crowded with bearded Russians, who stared at us with mingled feelings

of wonder and sympathy, and whose captain, Feodor Voronin, stood like a patriarch among them to welcome us. Ten days sooner and our poor dogs might have gambolled on the deck with us!

17. No grandees could have been received with more dignity than we were. At the sight of the two Ukases, which we had received from St. Petersburg, and which required all inhabitants of the Russian Empire to furnish us with all the help we needed, these humble seamen bared their heads and bowed themselves to the earth. We had an example before us to show how orders are obeyed by the subjects of that Empire a thousand miles from the place where they were issued. But we were received not only in this reverential manner, but were welcomed with the greatest heartiness, and the best of everything on board was spread before us—salmon, reindeer flesh, Eider-geese eggs, tea, bread, butter, brandy. The second skipper then came on board, and invited us to visit him: the first of a series of invitations. Dr. Kepes was very pressingly invited, for he had a sick man on board his vessel, and our doctor returned with a *honorarium* of tobacco in his hand. These simple Russian seamen of the Arctic seas freely produced their little stock of good things to give us pleasure, and one of them after observing me for a long time, and thinking that I did not express myself

THE BAY OF DUNES. THE RUSSIAN SCHOONERS.

sufficiently strongly for a happy man, persuaded himself that something was the matter with me, and that I wanted something. Forthwith he went to his chest, and brought me all the white bread he had and the whole remaining stock of his tobacco. Though I did not understand a word he said, his address was full of unmistakable heartiness, and so far needed no interpreter.

18. Since we abandoned the *Tegetthoff*, we had passed ninety-six days in the open air, and, including the sledge journeys which preceded the abandonment of the ship, about five months. The impressions of a return to life were felt by us with silent yet deep thankfulness of heart, for as the poet says:—

"Das Schweigen ist ihr bester Herold."

It gave us infinite satisfaction to gaze on things the most insignificant, and as we thought of our adventures, our discoveries, and our deliverance, many of us asked his heart in a whisper: What will be said of this in Austria? Lusina, as the only one among us who spoke Russian, was constituted our interpreter, and through him we learnt that great events had happened during our absence: that there was general peace in Europe; that Napoleon was dead; and we learnt too that the greatest interest in our destiny had been excited

in Austria; that the Russian government had issued orders to all their vessels employed in the Arctic fisheries to do their utmost to find us, and contribute to our rescue; that Count Wilczek had returned in safety—the skipper of our schooner having met him at the mouth of the Petschora, just as he was setting out for Obdorsk, and lastly: that a Norwegian fishing vessel had been beset in the ice in the autumn of 1872 at the Barentz islands—very near to where we were, and had been crushed; that four of the crew had escaped in a boat, and after the most dreadful sufferings, had travelled over land to the country of the Samoyedes in the extreme north of the Ural Mountains.

19. The ships we found in "Dunen Bai,"—the Bay of Dunes—came from Archangel, and were engaged in the salmon fishery, at the mouth of the Puhova River. They had taken very little, and their purpose was to remain where we found them for fourteen days' longer, and to spend about the same number in fishing and hunting at the southern extremity of Novaya Zemlya. This programme was not exactly to our taste. To spend a month in a fishing-vessel, just as we awoke to the remembrance of all the comforts and pleasures there are in the world, to sleep in the hold where cholera lurked among bear and reindeer hides, amid heaps of salmon and reindeer flesh, among nets and

oil casks—such a prospect was not to be thought of. Accordingly, we agreed with Captain Voronin, that he should leave off his fishing and take us without delay to Vardö, in Norway, that we should give him in return for his services three of our boats, two Lefaucheur rifles, and guarantee him the further compensation of 1,200 silver roubles.

20. At last we could go to sleep, the much-needed, much-desired sleep, undisturbed by the fear lest we should be starved to death at last. On that evening, when I opened my journal, I found these words: "Shall we be saved this day? shall we be alive? Fifteenth May on board the *Tegetthoff*." I had written these words by the merest chance on the blank leaf reserved for the 24th of August, and it was singular that we should be rescued on that very day. For a long time I could not sleep amid the murmur of Russian words, which I mechanically endeavoured to imitate and to interpret as I lay amid the dead salmon, till at last I fell asleep, my last connected thought being, that I had not to row any more. Next day Voronin and his trusty harpooner, Maximin Iwanoff, insisted on Weyprecht and myself occupying their own cabin, and as we could utter no other Russian word than 'khorosho' (good), we were obliged to do as they wished. The ship was now watered, and the nets which had been stretched out

were hauled on board, the crew, as they worked, singing their wild "Volkslieder" excellently well.

21. On the 26th we left the small quiet bay, the scene of our happy rescue, and with a favourable wind from the north, the vessel ploughed her way through the waves of the White Sea. Now began the time of letter writing; many of us, indeed, had commenced this employment even before we left the boats. On the 27th and 28th, we had stormy weather from the north-west, and the high seas we saw told us what our fate would have been had we tried to cross this sea in our small boats. On the 29th, we sighted Black Cape on the "Murmann coast," and for two hundred miles we ran under the low, rocky coast of Lapland. We often fell in with ships sailing from or to Archangel, and in our own eyes we seemed the only barbarians amid the commerce and civilization of the world. We sent deputations to every ship that came within hailing distance to beg tobacco or sheets of writing paper, without, however, betraying our incognito. We desired to be the first to give news of ourselves by the telegraph. Contrary winds compelled our captain to tack often, and the delay seemed to our impatience purgatory itself.

22. At length on the 3rd of September—the 812th day from the day we sailed from Bremerhaven—we

sighted the little seaport of Vardö. Forthwith the Austrian flag was displayed at the foretop of the *Nikolai*, while each of us, clad in his fur-coat, stood with beating hearts on deck ready to land. Söon she ran into the little harbour, and about three o'clock in the afternoon of that same day we put our feet on Norwegian soil with the glad thought that our dangers and our toils were over at last. While Weyprecht attended to our money affairs, I hastened, amid the wondering looks of the inhabitants, to the telegraph station to despatch the news of our happy rescue and safe arrival, and as each message sped on its way, our hearts glowed with joy as we thought that in a few minutes friends and countrymen would learn the good tidings and share in our joy.

23. On the 5th the mail steamer from Vardö to Hamburg took us on board, and stopping at Tromsö, we put ashore, with many adieus, our friend and companion Captain Carlsen. He had been one of those who believed that we should return home by Behring Straits; but here he landed, a touching instance of the vanity of human hopes. Apart from his linguistic acquirements —for he had learned to speak several languages on board the *Tegetthoff*—the hardy old Arctic voyager went ashore with three things only: his carefully preserved reindeer coat, his wig, and trusty walrus spear. But

all our hearts burned to reach home—home for its own sake; for no presentiment had any of us of the honours that awaited our arrival there. The favours shown to us by our monarch, the enthusiasm which greeted the news of the discoveries we had so marvellously made, the sympathy so abundantly expressed for our sufferings, made us feel that we were rewarded far beyond our deserts, and that we had gained the highest men can gain—the recognition of their services by their fellow-countrymen.

APPENDIX.

APPENDIX.

I.

METEOROLOGICAL OBSERVATIONS.

THE meterological observations were always taken by the officers of the watch, by Lieutenant Brosch, Midshipman Orel, the boatswain Lusina, and Captain Carlsen. Krisch, our engineer, who shared in this labour during the first winter was exempted from it in the second year, owing to his failing health. Readings of the thermometers were taken every two hours; observations to ascertain the moisture of the air were made by the psychrometer during the summer months; the direction and force of the winds, the amount of precipitation, the form and character of the clouds were carefully noted down. As their labours were zealously and conscientiously carried out for one year and a half, and chiefly in regions never before visited, the results are of peculiar importance.[1] The direction and force of the winds seemed

[1] These have not as yet been published.

in the first year to be nearly in equilibrium, save that in the south air currents from the south-west generally prevailed, while in the north the prevailing air-currents were from the north-east.

Thunder-storms never occurred; even on the northern shores of Siberia they are seldom experienced. The forms of the clouds in Arctic regions have never the sharply-defined contours of those in more southerly latitudes. In summer they increase in fulness, and in winter they consist chiefly of vapours and frosty mists which throw dark inky hues over the brightness of the nights. The proverbial clearness of the heavens, of which Koldewey, Kane, Middendorf, and Wrangel speak, is found in the high north, as also in the tropics only over the greater masses of land. "The clouds," says Weyprecht, "have either the uniform dull grey aspect of elevated fog, or they assume the cirrus form, and the latter is not as with us the fleecy mass rising high above the horizon, but consists of masses of mist rising little above it, which very seldom assume the sharply-defined forms which are seen in more southern regions. Instead of clouds gloomy fogs prevail, sometimes rising high, sometimes also close to the ground as if they were nailed to it. Four-and-twenty hours of clear weather rarely occur in summer; generally after shining for a few hours the sun disappears behind dense fogs. Dull and gloomy as these fogs are, they maintain the conditions which we find in the regions of ice,—they prevent the escape of the sun's heat and they act more potently on the ice than its direct

rays." With respect to the winds he adds: "Until the autumn of the second year, the winds were of a very variable nature. In the neighbourhood of Novaya Zemlya we had many south-east and south-west winds; in the spring the winds were more from the north-east. A prevailing direction of the wind was only discernible when we lay in our second winter under Franz-Josef Land. Here all snow-storms and about 50 per cent. of the winds come from east-north-east. These winds were mostly accompanied by clouds, which were dispersed only when the wind veered more to the north. The force of the wind is mitigated by the ice. Very frequently fog masses are seen driving rapidly at no very great height above the ice, while below them there is almost a calm. In the January of the two years we passed in the north, it was very interesting to observe the struggle between the cold winds from the north and the warmer winds of the south. The approach of warm winds from the south and south-west brought masses of snow, and in a short time produced a rise of temperature amounting to 30° to 35° R."

Falls of snow take place at all seasons of the year; but as they generally occur accompanied with strong winds, it is not very easy to determine the depth of the layers. Apart from extreme cases of snow-drifts the mean depth of the snow on the ice during winter was about three feet, and it is more considerable under the land than at a distance from it. Rain falls almost exclusively

only during the few months of summer, and generally in fine showers, never in the sudden torrents of southern latitudes. More rain fell with us in our second than in our first summer.

It was impossible, owing to our continued change of place, to give the barometrical means for any particular locality: in the following table, therefore, the monthly mean only is noted. The thermometers we used were placed at the distance of five-and-twenty paces from the ship, so that they were pretty well isolated from any influence due to it, and they were raised four feet above the surface of the snow.[1]

Readings of the minimum thermometer were taken at noon every day in the year, and of the black-bulb thermometer at different times of the day during the summer. The time of the day when the temperature reached its maximum was irregular during the winter; it occurred about two o'clock in the afternoon when the spring was well advanced. As I have already inserted in the course of the narrative the temperatures of each day in the month, it will be enough for the purposes of a general

[1] Thermometers should always hang freely; when they are inclosed in cases they give false values, especially if the cases should be filled with snow. In our first winter we were obliged on account of the ice-pressures to suspend our thermometers on the ship in such cases, and there can be no doubt that their readings were too high. Sometimes, however, they were too low, when the thermometers came in contact with the snow on the ship. Scoresby, Parry, and we ourselves observed that the temperature of the snow-covering sometimes sunk in clear winter nights some degrees below the temperature of the air.

survey to give here a summary of the mean monthly temperatures and of the maximum and minimum extremes :—

	Mean of the Barometrical Measurements.	Mean of the Monthly Temperature.	Maximum. R.	Minimum. R.
1872.				
July	—	—	—	− 2·4
August.	750·99	+ 0·41	+ 6·5	− 5·6
September . . .	748·92	− 7·34	+ 0·4	− 18·6
October	751·8	− 13·5	+ 2·0	− 26·5
November. . . .	757·27	− 19·52	− 2·3	− 28·7
December. . . .	757·11	− 23·95	− 14·9	− 28·7
1873.				
January	753·69	− 18·1	− 2·1	− 35·1
February	741·62	− 27·95	− 1·8	− 36·9
March	748·21	− 25·52	− 14·4	− 33 9
April	753·04	− 17·49	− 6·8	− 30·9
May	756·58	− 7·12	− 1·9	− 18·4
June	751·3	− 0·41	+ 8·1	− 8·6
July	750·23	+ 1·26	+ 6·4	− 1·8
August.	749·33	+ 0·32	+ 4·4	− 4·6
September . . .	747·79	− 3·32	+ 1·3	− 12·4
October	745·64	− 13·93	− 2·9	− 23·1
November. . . .	748·2	− 21·21	− 6·2	− 31·8
December. . . .	744·98	− 23·08	− 10·1	− 34
1874.				
January	732·97	− 19·6	− 1·7	− 36·7
February	744·92	− 22·83	− 1·7	− 35·5
March	742·25	− 18·46	− 1·0	− 36·9
April	751·15	− 12·32	− 2·8	− 22 8

II.

DIRECTION AND FORCE OF THE WIND, FROM OBSERVATIONS ON BOARD THE "TEGETTHOFF."

	Mean Direction and Force.			Mean Direction and Force.	
	Direction.	Force.		Direction.	Force.
1872.			May 31 . .	N5°W	0·53
July 15 . .	N53°E	1·36	June 30. . .	S79°E	0·97
August 31 .	S56°W	1·15	July 31 . .	N74°W	0·82
September 30	S45°W	0·54	August 31 .	S48°E	0·31
October 31 .	S23°E	0·43	September 30	S53°E	0·14
November 30	S71°E	0·26	October 31 .	N42°E	1·82
December 31 .	S44°E	0·64	November 30	N54°E	1·10
			December 31 .	N66°E	1·21
1873.			1874.		
January 31 .	S64°W	1·24	January 31 .	S70°E	0·93
February 28 .	N32°E	0·26	February 28 .	N47°E	1·16
March 31 . .	N37°E	0·63	March 31 . .	N59°W	0·83
April 30 . .	N61°E	0·53	April 30 . .	N80°E	0·94

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